PERSONAL COMPUTER

SOFTWARE MARKETS

INPUT

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INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions.

Continuous-information advisory services, proprietary research/consulting, merger/acquisition assistance, and multiclient studies are provided to users and vendors of information systems and services (software, processing services, turnkey systems, systems integration, professional services, communications, systems/software maintenance and support).

Many of INPUT's professional staff members have more than 20 years' experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed as a privately held corporation in 1974, INPUT has become a leading international research and consulting firm. Clients include more than 100 of the world's largest and most technically advanced companies.

INPUT OFFICES

North America

Headquarters
1280 Villa Street
Mountain View, CA 94041-1194
(415) 961-3300
Telex 171407 Fax (415) 961-3966

New York
959 Route 46 East, Suite 201
Parsippany, NJ 07054
(201) 299-6999
Telex 134630 Fax (201) 263-8341

Washington, D.C.
1953 Gallows Road, Suite 560
Vienna, VA 22182
(703) 847-6870 Fax (703) 847-6872

International

Europe
Piccadilly House
33/37 Regent Street
London SW1Y 4NF, England
(01) 493-9335
Telex 27113 Fax (01) 629-0179

Paris
52, boulevard de Sébastopol
75003 Paris, France
(33-1) 42 77 42 77 Fax (33-1) 42 77 85 82

Tokyo
Saida Building
4-6, Kanda Sakuma-cho
Chiyoda-ku, Tokyo 101, Japan
(03) 864-0531 Fax (03) 864-4114

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Market Analysis Program (MAP)

Personal Computer Software Markets

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Abstract

This report provides an analysis and five-year summary of the U.S. personal computer/workstation software market for the period 1989-1994. The forecasts contained in this report divide the market between systems and applications software for the personal computer/workstation platform.

The five-year forecast period, using the base year of 1988, covers fifteen industry-specific and seven cross-industry applications software markets, and three sectors of the systems software market. These three sectors are systems control, data center management tools, and application development tools.

Personal Computer Software Markets also discusses the issues and trends affecting the PC software market and provides recommendations on how vendors can take advantage of the forces driving the market.

The report consists of seven chapters and four appendixes. Chapter I provides an introduction to the report, covering the scope and methodology. Chapter II is an executive overview summarizing the key findings of the report. Chapter III provides the market size and forecast, including discussions on market forces. Chapter IV covers the issues and trends of the PC/workstation software market. Chapter V provides information on the competitive environment and profiles characteristics and functionality of successful PC software products. Chapter V also includes profiles of several of the leading microcomputer software companies. The report concludes with recommendations in Chapter VI and conclusions in Chapter VII. The appendixes include the user questionnaire, the vendor questionnaire, the PC/workstation forecast for 1989-1994, and an INPUT list of definitions.

The report contains 132 pages, including 47 exhibits.

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AUTHOR
TURNKEY SYSTEMS OPPORTUNITIES

TITLE
WESTERN EUROPE 89-94

DATE LOANED	BORROWER'S NAME

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Table of Contents

I

Introduction 1

A. Objective and Audience 1
B. Scope and Use 2
C. Methodology 7
D. Related INPUT Reports 9

II

Executive Overview 11

A. Purpose 11
B. The Personal Computer Software Market 11
  1. Overall Market 1989-1994 11
  2. Systems Software by Sub-Delivery Mode 13
  3. Applications Software—Industry-Specific and Cross-Industry 14
  4. User Survey Findings 15
    a. Software Characteristics 15
    b. Software Features Missing 16
    c. Successful Software Solution Profile 17
    d. Training and Support 17
C. Recommendations 19

III

Market Size and Forecasts 21

A. Overall Market 1989-1994 21
B. Systems Software by Sub-Delivery Mode 21
C. Applications Software—Industry-Specific and Cross-Industry 23
D. Largest Markets 25
E. Growth 25
F. Top Vendors—Market Coverage 27
G. Market Forces 29

Table of Contents (Continued)

H. Market Opportunities 32
I. Processing Services/Professional Services Companies—The Software Product Component of Total Offering 32

IV Issues and Trends 33

A. Overall Issues 33
    1. User Trends 35
    2. Vendor Trends 38
B. Funding Sources 39
C. New Applications and Improvements 42
D. Total Solutions/Bundled Marketing 47
E. Entry of Service Companies into the Software Market 48
F. Impact of Large Computer Systems Vendors on the PC Market 48
G. Software VARs—Alternative Marketing Approaches 49
H. Open Systems Architectures 49
I. Standards 49
J. New Technologies 50
K. Networking Solutions 50

V Competitive Environment 53

A. Competitive Strategies 53
B. Characteristics/Functionality of Successful PC Software Products 61
C. Software Company Profiles 65
    1. Adobe Systems Incorporated 66
    2. Ashton-Tate Corporation 68
    3. Borland International, Inc. 70
    4. Computer Associates International, Inc. 72
    5. Lotus Development Corporation 73
    6. Microsoft Corporation 75
    7. The Santa Cruz Operation, Inc. 77
    8. Software Publishing Corporation 79
    9. Sybase 82
    10. WordPerfect Corporation 83

VI Recommendations 87

VII Conclusions 89

A Appendix: INPUT Definitions 91

A. User Expenditures 91
B. Delivery Modes 91
C. Hardware/Hardware Systems 96
D. Telecommunications 98
E. Other Considerations 100

B Appendix: Market Forecast Data Base, 1989-1994 105

C Appendix: User Questionnaire 107

D Appendix: Vendor Questionnaire 121

Exhibits

I

-1 Information Services Industry Structure—1989 3
-2 Software Products Market Structure 4
-3 Systems Software Products Market Structure 5
-4 Applications Software Products Market Structure 6
-5 GNP Nominal Growth Rate Assumptions 8
-6 Growth Rates by Delivery Mode 8

II

-1 Total Personal Computer/Workstation Software Expenditures, 1988-1994 12
-2 Total Personal Computer/Workstation Systems Market by Software Submode, 1988-1994 14
-3 Total Personal Computer/Workstation Applications Software Products Markets by Principal Segments, 1988-1994 15
-4 Features Missing in Current Software 16
-5 Successful Software Product Profile 18
-6 Recommendations 19

III

-1 Total Personal Computer/Workstation Software Expenditures, 1988-1994 22
-2 Total Personal Computer/Workstation Systems Market by Software Submode, 1988-1994 23
-3 Total Personal Computer/Workstation Applications Software Products Markets by Principal Segments, 1988-1994 24
-4 PC/Workstation Software Products Markets, 1988-1994 26
-5 Leading Vendors by Type of Software 27
-6 Software Developers' Operating Systems 28
-7 Market Drivers 29
-8 Market Inhibitors 30

Exhibits (Continued)

IV

-1 Overall Issues 33
-2 User Trends 35
-3 User PC/Workstation Installed Configuration 36
-4 Applications Per Personal Computer 37
-5 Vendor Trends 38
-6 Funding Sources 39
-7 Channels Through Which Users Purchase Software 40
-8 Influence on Purchasing Decision 41
-9 Degree of Involvement by the MIS/DP Area 42
-10 Installed Equipment Base 43
-11 System Software Installed 44
-12 Cross-Industry Software Installed 45
-13 Features Missing in Current Software Products 47

V

-1 Vendor Strategies 53
-2 Vendor Software Support Offerings 55
-3 Software Support Ratings 56
-4 Training/Support Improvements 57
-5 Vendor Views on User Requirements 58
-6 User Training Requirements 59
-7 User Training and Support Improvement Requirements 60
-8 Importance of Software Characteristics 61
-9 Software Problems 63
-10 Successful Software Product Profile 64
-11 New Application Information Channels 65

VI

-1 Software Opportunities 87

A

-1 Industry Sector Definitions 101

B

-1 Workstation Software User Expenditure Forecast by Industry Sector, 1989-1994 105

I

Introduction

I

Introduction

The *Personal Computer Software Markets Report, 1989-1994* is a companion report to the four annual Market Analysis and Planning Service reports. These reports are:

- *Software Products Market, 1989-1994*
- *Processing/Network Services Market, 1989-1994*
- *Professional Services Market, 1989-1994*
- *Turnkey Systems Market, 1989-1994*

A

Objective and Audience

Many studies and reports have been produced in recent months that examine the hypothetical personal computer user and his future requirements. Personal computers have found their way into almost every facet of our lives. Birth statistics are entered into a personal computer networked to the hospital's main system to record births and background information. School records and schedules are prepared and compiled year by year and uploaded to the state education computers. Census information is analyzed on PCs and used for determining road patterns and municipal services. Doctors keep health records on their personal computers, and pharmacies track a customer's medications as well as insurance information.

With the lowered cost of the personal computer and its availability to the individual in the work environment and at home for personal use, there is a great need for software that will take care of both types of use. Software to run the systems and the applications has become paramount to the success of the personal computer.

This report reviews and analyzes the issues, trends, and market forecasts of the PC software market in three areas: 1) system software, 2) cross-industry applications software, and 3) industry-specific applications software. Emphasis is placed on the perceptions and real needs of end users, and on trends in emerging technologies.

Included in the report is a detailed five-year forecast of the market and its subsets; a description of the forces that drive or inhibit the market; a discussion of leading vendors, their activities, and market share; and recommendations for vendors, to leverage their presence in these markets.

Vendors interested in the needs and future plans of end users will be able to use this report to identify the opportunities and characteristics of the market so as to expand market share or enter the PC software market.

Major personal computer users and buyers will find this report useful to gain a better understanding of vendor software development plans, the issues facing vendors, operating systems and the thrust for standardization, and growing services offerings for the future.

B

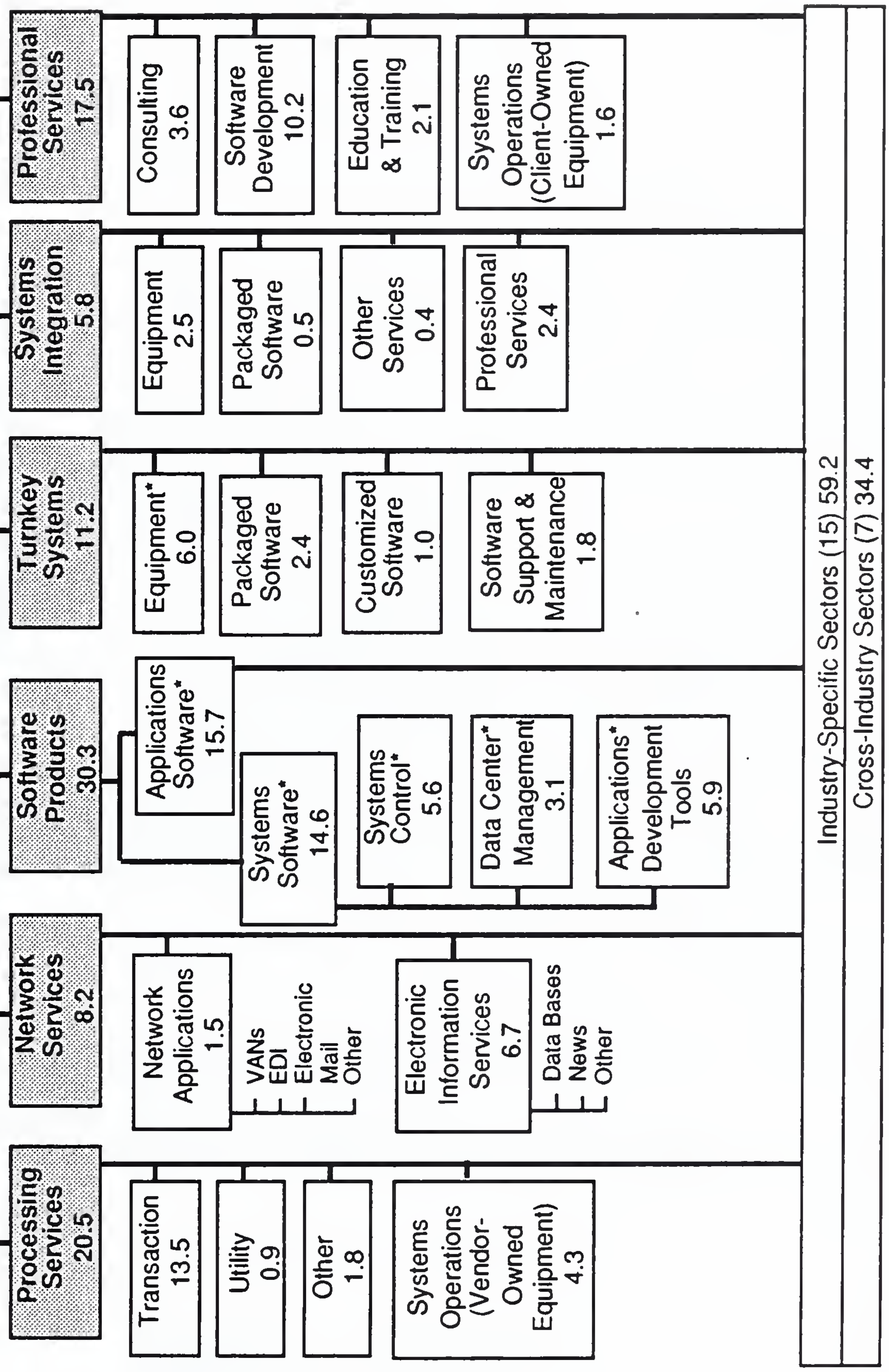
Scope and Use

The scope of the information services industry tracked and analyzed by INPUT is defined in Exhibit I-1. Six major delivery modes are examined. This is a refinement from the four modes used to describe the industry in previous years. The prominence of the processing/network services mode has led to its separation into two distinct delivery modes. The rapid growth of the systems integration segment of the professional services market has led to its examination as a separate delivery mode.

User expenditures are the dollars spent to procure the software, and may include markups based on the channel of distribution involved. For example, companies that get products to the end user through a retail distribution channel receive roughly one-half of the retail price of the software. The other half of the cost supports the channel participant.

EXHIBIT I-1

INFORMATION SERVICES INDUSTRY STRUCTURE—1989
($ Billions)



*Broken out by PC/Workstation, Minicomputer, and Mainframe segments

Source: INPUT

This report presents user and vendor issues, trends, and market information on user expenditures in the U.S. personal computer software market. The U.S. software market is presented in two major categories: systems and applications software, as shown in Exhibit I-2.

EXHIBIT I-2

Software Products Market Structure

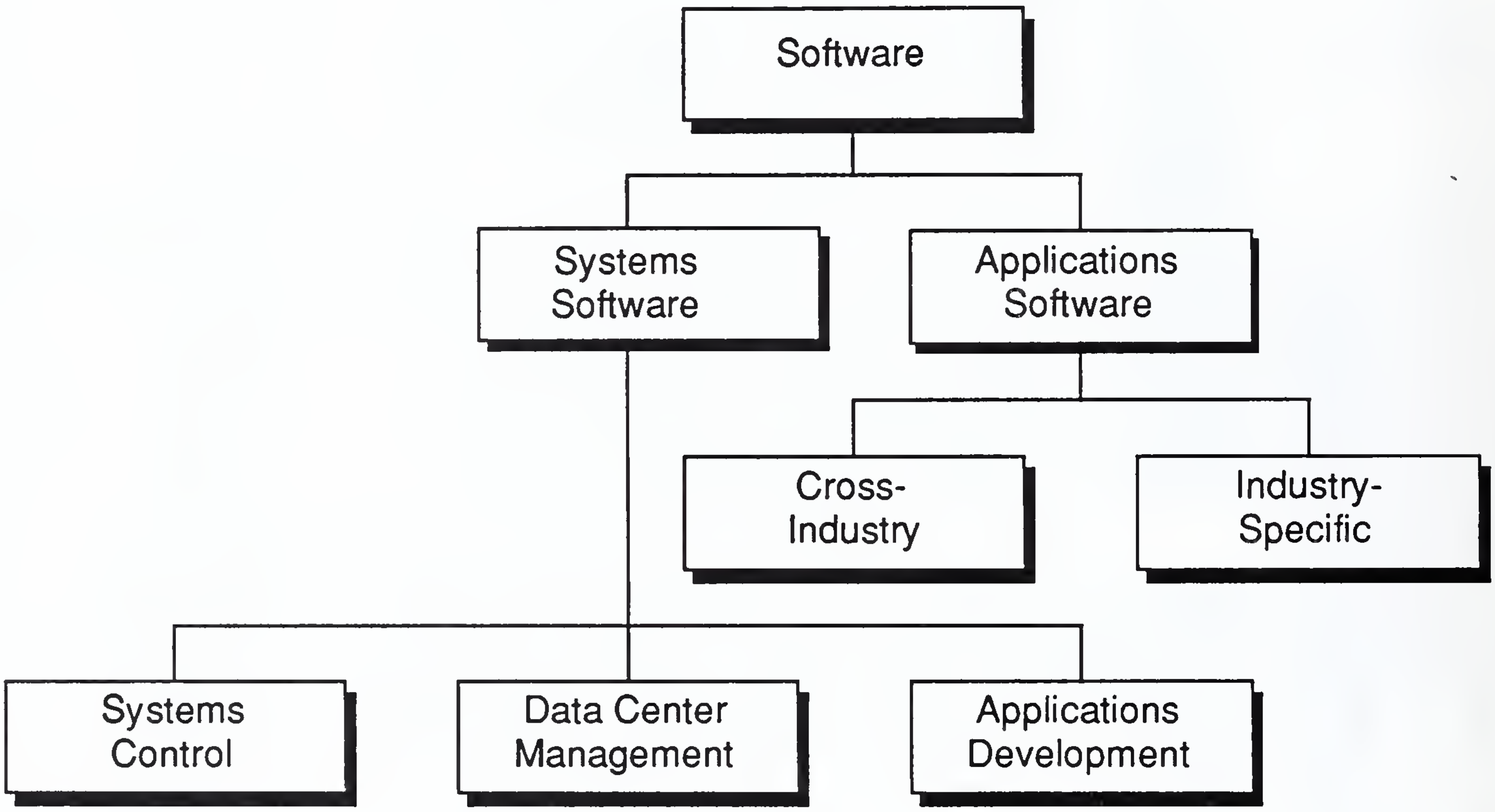
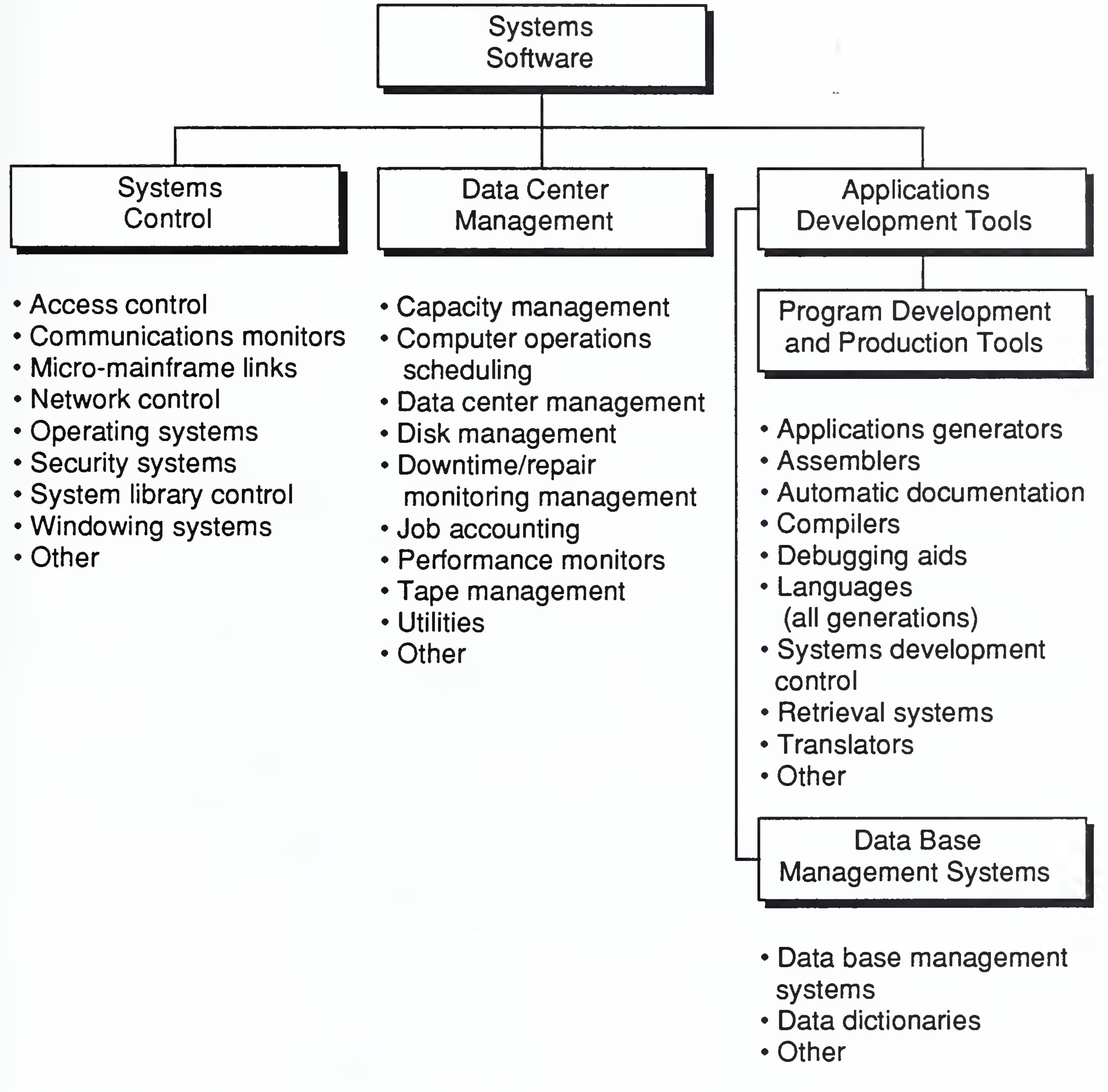


Exhibit I-3 shows the systems software portion further divided into three main areas: systems control, data center management, and applications development tools (also known as applications enabling). Each of these categories is further described in terms of the specific functions of the software in that category.

EXHIBIT I-3

Systems Software Products Market Structure



Systems Software

Systems Control

- Access control
- Communications monitors
- Micro-mainframe links
- Network control
- Operating systems
- Security systems
- System library control
- Windowing systems
- Other

Data Center Management

- Capacity management
- Computer operations scheduling
- Data center management
- Disk management
- Downtime/repair monitoring management
- Job accounting
- Performance monitors
- Tape management
- Utilities
- Other

Applications Development Tools

Program Development and Production Tools

- Applications generators
- Assemblers
- Automatic documentation
- Compilers
- Debugging aids
- Languages (all generations)
- Systems development control
- Retrieval systems
- Translators
- Other

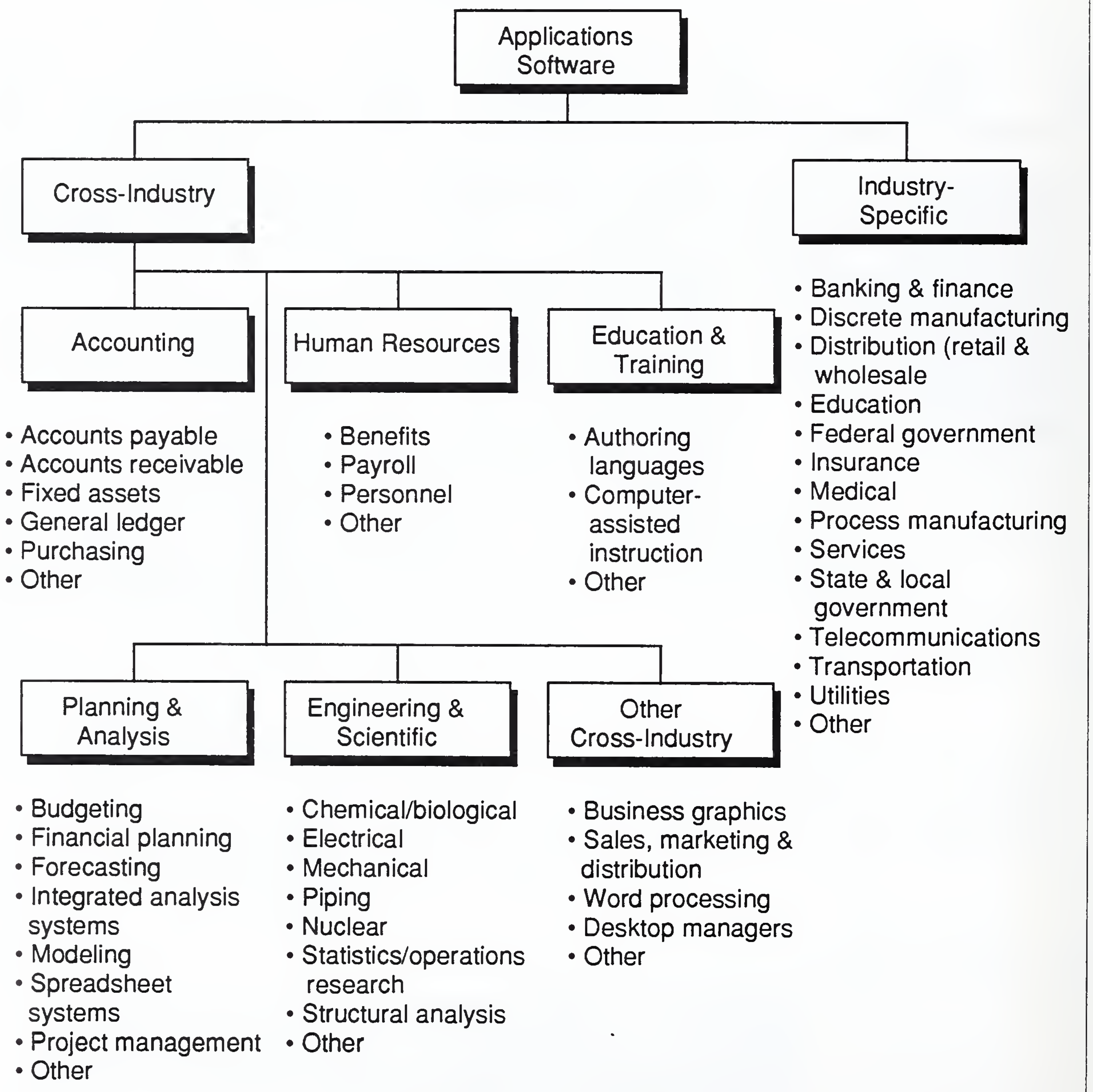
Data Base Management Systems

- Data base management systems
- Data dictionaries
- Other

The applications software segment forecast is structured into industry-specific and cross-industry markets as shown in Exhibit I-4. The industry-specific market sectors (as defined by the federal government's two-digit Standard Industrial Classification (SIC) codes) are the same sectors reported in other INPUT Market Analysis and Planning Service reports. Similarly, the cross-industry sectors are defined in the same manner as those reported in the MAPS cross-industry reports.

EXHIBIT I-4

Applications Software Products Market Structure



The report consists of seven chapters and four appendixes. These are:

- Introduction
- Executive Summary
- Market Size and Forecasts
- Issues and Trends
- Competitive Environment
- Recommendations
- Conclusions
- Appendix A: Definitions
- Appendix B: Market Forecast Data Base, 1989-1994
- Appendix C: User Questionnaire
- Appendix D: Vendor Questionnaire

C

Methodology

The information used in this report was gathered from interviews with personal computer users and vendors in the personal computer software arena. INPUT staff conducted telephone interviews with over 65 personal computer users in the banking, finance, manufacturing, insurance, and education industries, as well as users from various other industries. Executive interviews were conducted with a representative sample of the major vendors in the personal computer software arena. Other INPUT reports and studies were consulted as secondary sources. The user questionnaire can be found in Appendix C and the vendor questionnaire is located in Appendix D.

INPUT used the information gained from these interviews to enhance its understanding of the marketplace and the vendor activities in this area. Vendor knowledge was added to the existing data base of information gained from annual research, and used in the forecasting of total user expenditures for the information services industry.

In developing the five-year forecast, INPUT has made some economic assumptions regarding the outlook for the total U.S. economy and the impact on the software delivery modes within the information services industry. The GNP growth rate assumptions for the information services industry and the systems and applications software segments are detailed in Exhibit I-5 and Exhibit I-6.

EXHIBIT I-5

GNP Nominal Growth Rate Assumptions (Percent)

	1988A	1989E	1990E	1991E	1992E	1993E	1994E
Real GNP	4.4	2.8	2.5	2.3	2.0	2.0	2.0
GNP Deflator*	3.0	4.8	5.2	5.5	5.0	4.5	4.5
Nominal GNP	7.4	7.6	7.7	7.8	7.0	6.5	6.5

* Year-to-year comparisons

EXHIBIT I-6

Growth Rates by Delivery Mode (Percent)

Systems Software Products

	1988A	1989E	1990E	1991E	1992E	1993E	1994E
Real GNP	19.0	15.2	12.8	12.5	13.0	14.5	14.5
GNP Deflator 3.0	4.8	5.2	5.5	5.0	4.5	4.5	
Nominal GNP	22.0	20.0	18.0	18.0	18.0	19.0	19.0

Application Software Products

	1988A	1989E	1990E	1991E	1992E	1993E	1994E
Real GNP	18.0	15.2	14.8	9.5	11.0	12.5	12.5
GNP Deflator 3.0	4.8	5.2	5.5	5.0	4.5	4.5	
Nominal GNP	21.0	20.0	15.0	15.0	16.0	17.0	17.0

D

Related INPUT Reports

Additional information on the U.S information services industry and the U.S. software market can be found in the following reports:

U.S. Information Services Market, 1989-1994

U.S. Software Products Market, 1989-1994

Additional information on the federal microcomputer market can be found in the Federal Information Systems and Services Program (FISSP) report, *Federal Microcomputer Market, 1989-1994*.

II

Executive Overview

II

Executive Overview

A
Purpose

Many studies have been produced in recent months that examine the hypothetical personal computer user and his future requirements. With the lowered cost of the personal computer and its availability to the individual in the work environment and at home for personal use, there is a great need for software that will take care of both types of use.

This report reviews and analyzes the issues, trends, and market forecasts of the PC software market in three areas: 1) system software, 2) cross-industry applications software, and 3) industry-specific applications software. Emphasis is placed on the perceptions and real needs of end users, and on trends in emerging technologies.

Included in the report is a detailed five-year forecast of the market and its subsets; a description of the forces that drive or inhibit the market; a discussion of leading vendors, their activities and market share; and recommendations for vendors, to leverage their presence in these markets.

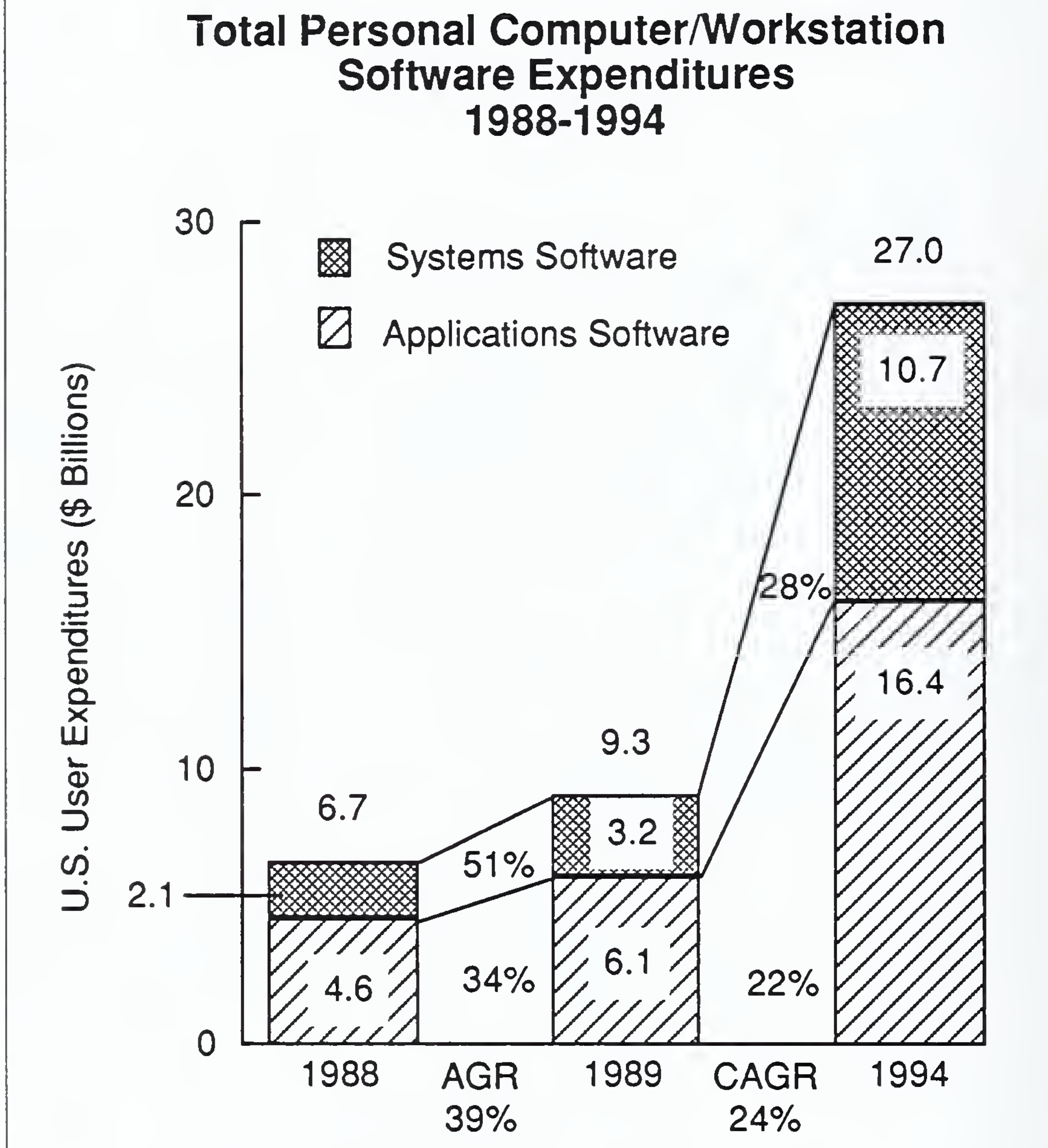
The information used in this report was gathered from interviews with personal computer users and vendors in the personal computer software arena. Executive interviews were conducted with a representative sample of the major vendors in the personal computer software arena. Other INPUT reports and studies were consulted as secondary sources.

B
The Personal Computer Software Market

1. Overall Market 1989-1994

INPUT forecasts the market for personal computer software to be $9.3 billion in 1989, growing at a CAGR (compound annual growth rate) of 24% to $27.0 billion in 1994, as shown in Exhibit II-1. This reflects a higher growth rate than INPUT's projections for the total systems software market of 18%, and the total applications software market with a CAGR of 15%. Personal computer software represents almost 10% of the total information services market of $93.8 billion for 1989. The total information services market CAGR is projected to be 15%, going from $93.8 billion in 1989 to $191.0 in 1994.

EXHIBIT II-1



Note: Numbers have been rounded.

Particularly strong growth is anticipated in the area of personal computer software, reflecting the strong trend to distributed processing and client/ server implementations. The general personal computer equipment market is expected to grow at an approximate 13% compound annual growth rate during the 1989-94 period.

2. Systems Software by Sub-Delivery Mode

Systems software provides the general operating and applications development background for the hardware platform. INPUT subdivides the systems software market into three major submodes: systems control, data center management, and applications development tools and utilities.

INPUT classifies graphics and word processing tools as cross-industry office systems applications. Applications development tools include program development and production tools as well as data base management systems for developing applications.

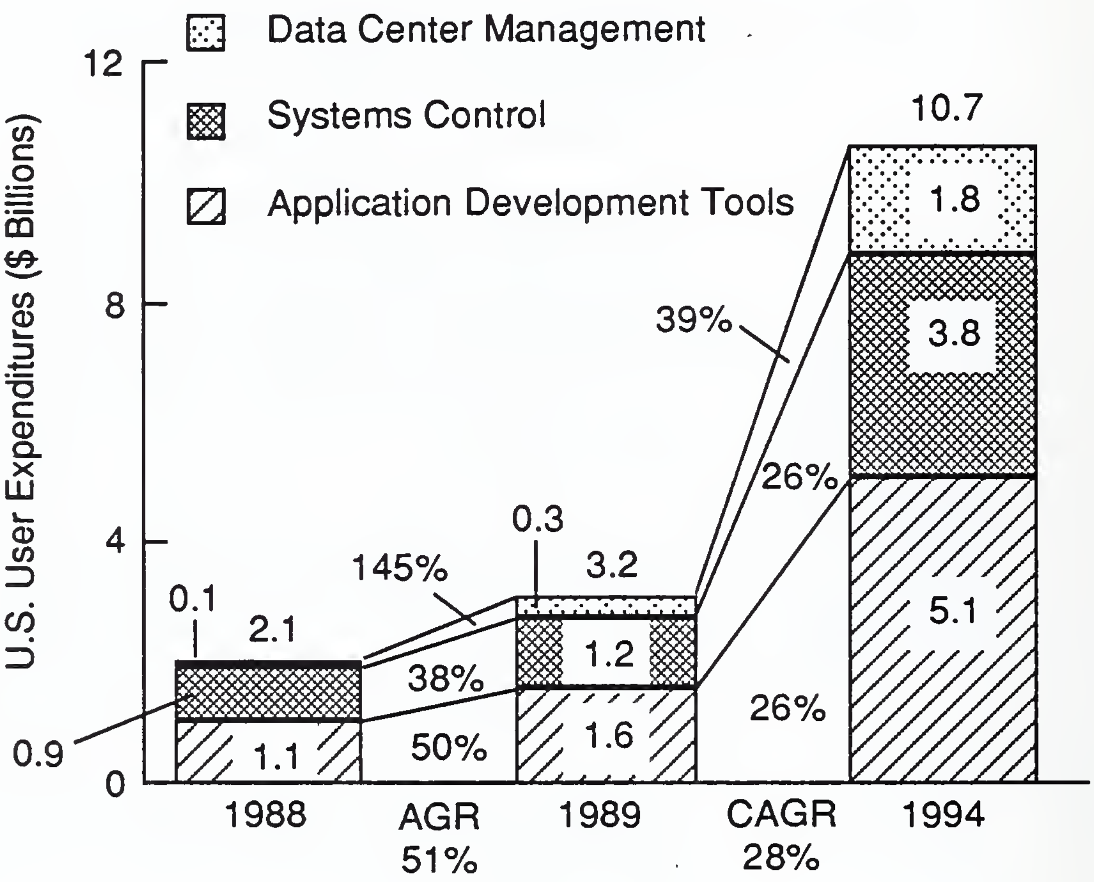
The overall market for systems software is projected to be $14.8 billion in 1989 and grow at a CAGR of 18% to a market of $34.4 billion in 1994. The personal computer systems software segment is expected to grow at a higher CAGR of 28%, from $3.2 billion in 1989 to $10.7 billion in 1994. Exhibit II-2 depicts the personal computer software market for the application development tools, systems control, and data center management submodes.

Factors contributing to the growth in personal computer systems software include the cost/performance attributes of personal computers and workstations versus the minicomputer and mainframe environments, and the production transition to multiuser/multitasking software on microcomputers from the mini and mainframe environments.

Factors inhibiting the systems software market include the confusion over a standard operating system for the microcomputer: OS/2 versus UNIX, the two opposing UNIX standards, and the maturation of industry equipment ship rates.

EXHIBIT II-2

Total Personal Computer/Workstation Systems Market by Software Submode 1988-1994



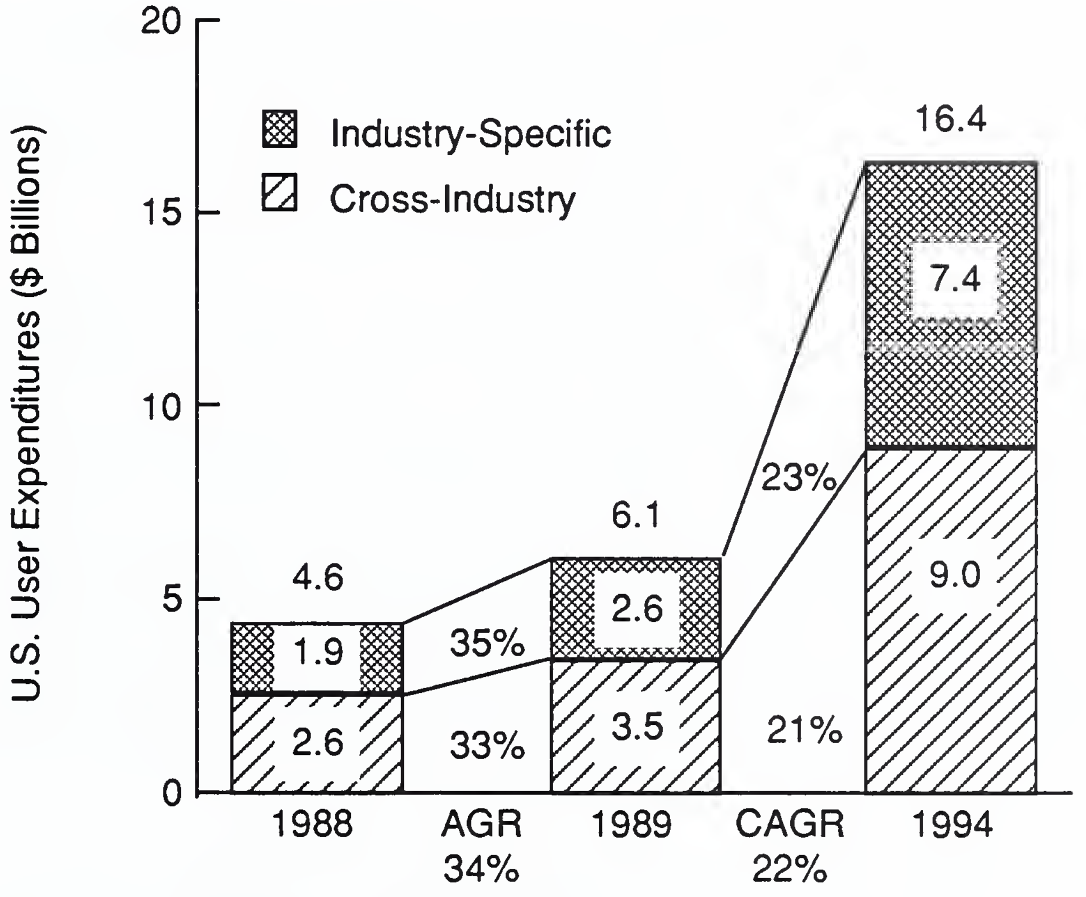
Note: Numbers have been rounded.

3. Applications Software—Industry-Specific and Cross-Industry

The applications software segment consists of two main categories: industry-specific (vertical markets) and cross-industry software. Industry-specific products address the functional requirements of particular industries, such as discrete manufacturing with MRPII and cost accounting solutions and the insurance industry, with underwriting analysis, policy management, and claims adjustment software. Cross-industry application software provides solutions that can apply to common functions in any industry. Examples of cross-industry software would include office systems, accounting, desktop publishing, and education and training software. Exhibit II-3 presents the size of these two market segments in 1988, and INPUT's projection of these applications groups in 1989 and 1994.

EXHIBIT II-3

Total Personal Computer/Workstation Applications Software Products Markets by Principal Segments 1988-1994



Note: Numbers have been rounded.

Factors driving the application software market include cost/performance attributes of the personal computer with the 386, 486 and 68030 chips versus mainframes and minis and the client/server architecture popularity of the personal computer in distributed processing. The increasing sophistication and functionality of personal computer-based software contributes to the forces driving the application software market.

Inhibiting forces affecting the applications software market as well as the system software market include the slowing of equipment shipments, the relative maturing of the cross-industry application market, and the confusion over forthcoming standards in the operating system area.

4. User Survey Findings

a. Software Characteristics

Users were asked to rate the importance of various personal computer software characteristics. The characteristic with the highest rating was IBM compatibility. At present, IBM seems to be the standard architecture in the market, with IBM and compatibles comprising over 75% of the personal computers reported by our respondents. It is extremely important to the respondents that they can obtain software compatible with the IBM and with the requirements for functionality that they require.

The second most important characteristic appears to be software performance. As users expect more efficiencies from using personal computers, and the micro becomes an integral part of the workplace, the drive for performance and software attaining maximum efficiency becomes paramount to the user.

Software features and ease of use appear to be of some importance to the user, but this data also implies that the user may be willing to compromise in these areas in favor of compatibility and performance.

Vendor reputation, support, and documentation also rated fairly high. Source code availability, with the lowest rating, does not seem to be an issue with the personal computer users interviewed. This feature was, in the past, important to users that had a formal MIS programming area and worked with midsize and mainframe applications. Programmers would modify the source code to their particular specifications. With the low involvement of the MIS areas and the downsizing of applications, there doesn't appear to be an environment that requires codes for the purpose of modification.

b. Software Features Missing

Users were questioned on what features were missing in their personal computer software. Exhibit II-4 presents the features that users found to be lacking in current software.

EXHIBIT II-4

Features Missing in Current Software

- Integrated software
- Integrated support
- Graphic user interface
- Better use of memory/technology

The feature mentioned most often by users is integrated software applications. Standardization of software interfaces or compatibility is necessary to provide an easily accessible total work environment for the user, both horizontally and vertically throughout the organization.

- A standardized link between the mainframe and the micro would facilitate the sharing of information. Each device would handle the processing most suited to its capabilities.

- Users are expressing a need to share information across application lines. The sharing of information between applications eliminates multiple entry of data and increases productivity.

There is a user requirement for part of the support function of training and installation to be included as part of the application. More of the users are less technically oriented and more dependent on the help that integrated application support could provide.

Graphic user interface between the hardware and the application software is on the user's list of missing features. Users want to see more of the "looks" of applications for which the Macintosh operating system has become famous. Users like the feel of the Macintosh's pull-down windows and mouse control of the keyboard. Menus are extremely important for use by nontechnical users, who find it easier to work with a menu than a directory.

Users want applications that take full advantage of recent advances in global software, such as more software that incorporates Presentation Manager and Windows. With advances in software technology, users are finding it unacceptable to wait two or three years for their applications to catch up. Rapid advances are occurring especially in the areas of technology (more-powerful equipment) and operating systems (increasing efficiency and ease of use).

c. Successful Software Solution Profile

Based on the importance of software characteristics and problems with current software as rated by the users, Exhibit II-5 presents a profile of a successful software product solution.

d. Training and Support

Users are still basically dependent on the software vendors for many of the services that they require. Users were queried on the types of improvements they would like to see in the areas of training and support.

The two items mentioned most often were providing independent study tools and additional, knowledgeable staff to respond to users' requests.

EXHIBIT II-5

Successful Software Product Profile

- IBM hardware/software compatibility
- Performance exceeds expectations
- Features specific to application
- Generally expected operational features (graphical interface, windows, etc.)
- Ease of use for all levels of user sophistication
- Highly reputable vendor
- High level of vendor support
- Documentation clear and well organized
- Low time commitment to train on software
- Copy protection not an encumbrance
- Site licensing available
- Competitive price
- Easy installation

Suggestions for types of independent study aids included instruction on the personal computer in the form of computer-assisted instruction (CAI) and tutorials. Video instruction was also mentioned as an option that would enable users to learn the software at their own pace and at a convenient time.

Additional and better-informed staff was the item mentioned second most often by users as a vendor area of improvement. Users voiced a concern for the number of vendor support staff and its quality. A desire for more-responsive services relates to the concern regarding the number of staff. Users mentioned better hotline response times as their chief area of concern.

Users who depend on the vendor for training and support needs appear to be concerned about the quality of services offered. Many users felt they paid enough for the software to cover the costs of these ancillary services. Users do not believe they should have to pay extra for support and basic training.

C
Recommendations

One of the most basic strategies for software products success is to provide the best possible product to the users, as shown in Exhibit II-6. Staying on the leading edge of technology and application features is the most important aspect of being successful as a software provider. The products must take advantage of the most current technology as well as provide the user with high levels of ease of use and valuable functions for the intended purpose.

EXHIBIT II-6

Recommendations

- Product
  - Leading-edge products
  - Integrated products
- Support
  - Client support
  - Channel support
- Marketing/alliances
  - Joint marketing
  - Alliances

The second product strategy is providing integrated products. The primary strategy is to cover the customer's universe with as many integrated platform applications as possible—the applications should run between incompatible devices within the size group or across hardware size categories. In cases where vendors have concentrated on one or two applications, they should provide those applications with the capabilities to port to other platforms, or to provide file-compatible interfaces to other noncompatible application software.

Support strategies relate to the way the vendor supports the products after they have been developed. The first strategy is providing actual client support in terms of centralized technical support, education and training, seminars, consulting and application planning, and software fixes and upgrades. Users require additional vendor personnel who are knowledgeable and provide better service when the calls come in. The vendors should consider improving services by increasing the number of qualified support staff, improving staff competency, and adding centralized phone support (this has the greatest vendor leverage on customer satisfaction).

Specialized channel support and separate divisions providing related professional services for software users are other areas vendors should address. Vendors should focus the types of channel support to maximize the potential of each. Professional services departments or divisions address the specialized consulting and support services required by users.

Overall, the types and level of support required by the user community will increase over the next few years. The software's complexity and the computer novice trying to become proficient are the main factors contributing to an increase in the demand for training and support in the future. The in-house staff is usually able to offer limited supplemental training and support.

III

Market Size and Forecasts

III

Market Size and Forecasts

A

Overall Market 1989-1994

INPUT forecasts the market for personal computer software to be $9.3 billion in 1989, growing at a CAGR (compound annual growth rate) of 24% to $27.0 billion in 1994, as shown in Exhibit III-1. This projection calls for a slightly higher growth rate than INPUT's projections for the total systems software market (18%) and the total applications software market (15%). Personal computer software represents approximately 10% of the total informations services market of $93.8 billion for 1989.

Particularly strong growth is anticipated in the area of personal computer software. Such growth reflects the strong trend to distributed processing and client/server implementations. The general personal computer equipment market is expected to grow at an approximate 13% compound annual rate.

B

Systems Software by Sub-Delivery Mode

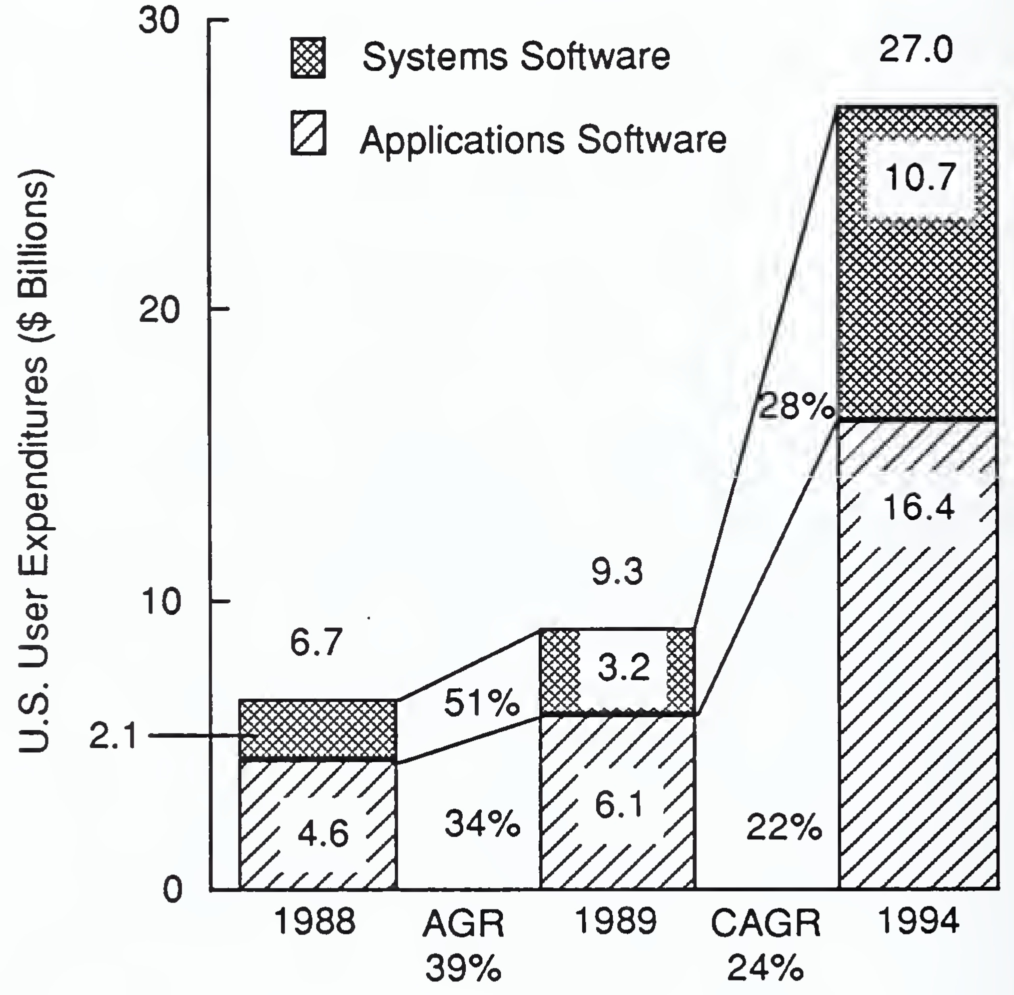
Systems software provides the general operating and applications development background for the hardware platform. INPUT subdivides the systems software market into three major submodes: systems control, data center management, and applications development tools and utilities.

INPUT classifies graphics and word processing tools as cross-industry office systems applications. Applications development tools include program development and production tools, as well as data base management systems for developing applications.

The overall market for systems software is projected to be $14.8 billion in 1989 and to grow at a CAGR of 18% to a market of $34.5 billion in 1994. The personal computer systems software segment is expected to

EXHIBIT III-1

Total Personal Computer/Workstation Software Expenditures 1988-1994



Note: Numbers have been rounded.

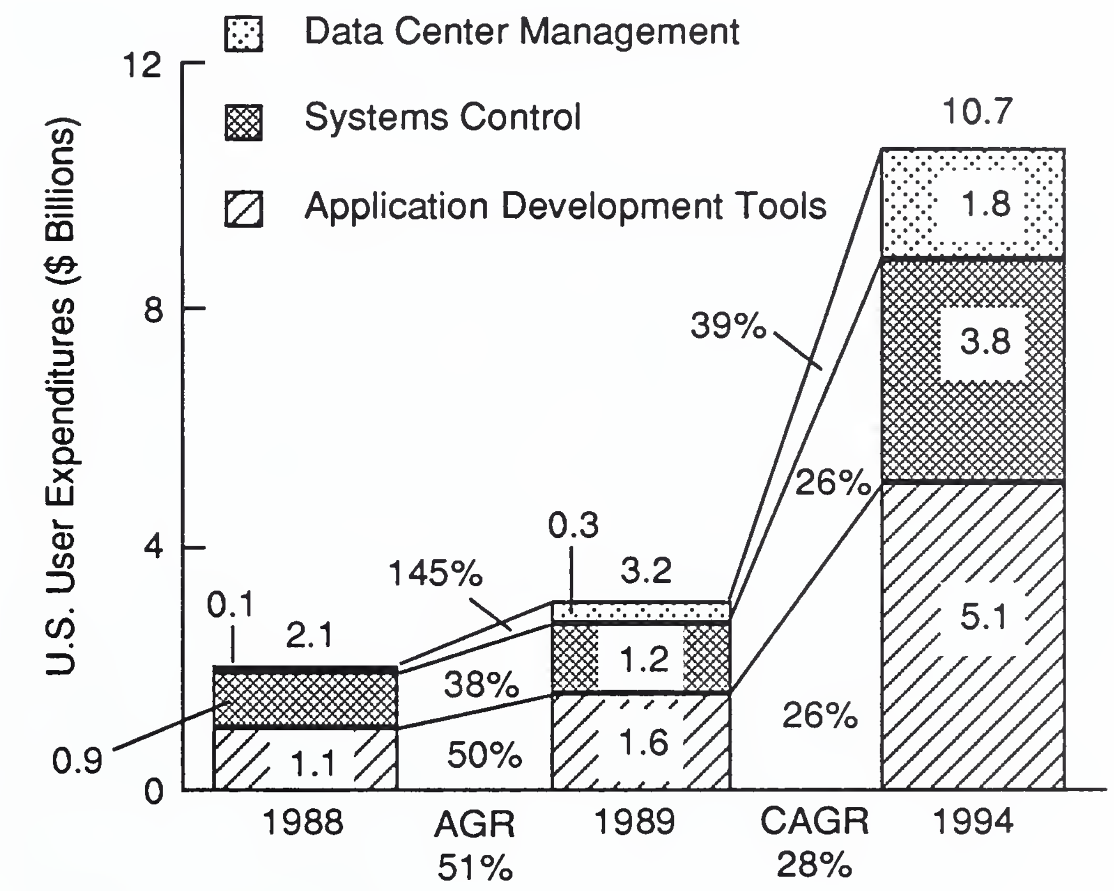
grow at a higher CAGR of 28%—from $3.1 billion in 1989 to $10.7 billion in 1994. Exhibit III-2 depicts the personal computer software market for the application development tools, systems control, and data center management submodes.

Factors contributing to the growth in personal computer systems software include the cost/performance attributes of personal computers and workstations versus the minicomputer and mainframe environments. There is a transference of application development tools resident on the minis and mainframes to the microcomputers. More application development is being planned for the microcomputer environment.

The production transition to multiuser/multitasking software on the microcomputers from the mini and mainframe environments will also contribute to the growth of the systems software segment.

EXHIBIT III-2

Total Personal Computer/Workstation Systems Market by Software Submode 1988-1994



Note: Numbers have been rounded.

Factors inhibiting the systems software market include the confusion over a standard operating system for the microcomputer (OS/2 versus UNIX) and the maturing of industry hardware ship rates.

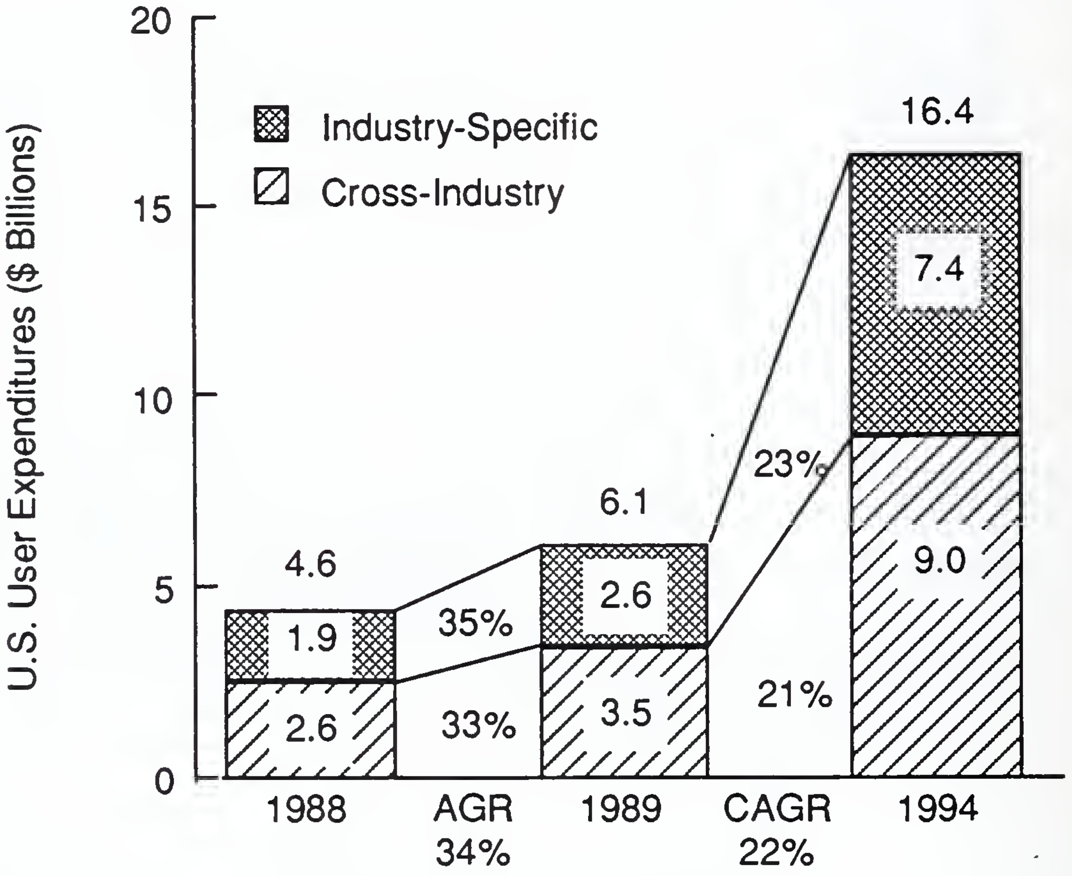
C

Applications Software—Industry-Specific and Cross-Industry

The applications software segment consists of two main categories: industry-specific (vertical markets) and cross-industry software. The industry-specific market segment addresses the functional requirements of particular industries, such as discrete manufacturing with MRPII and cost accounting solutions and the insurance industry, with underwriting analysis, policy management, and claims adjustment software. Cross-industry application software provides solutions that can apply to common functions in any industry. Examples of cross-industry software would include office systems, accounting, desktop publishing, and education and training software. Exhibit III-3 presents the size of these two tion and training software. Exhibit III-3 presents the size of these two market segments in 1988, and INPUT's projection of these applications groups in 1989 and 1994.

EXHIBIT III-3

Total Personal Computer/Workstation Applications Products Markets by Principal Segments 1988-1994



Note: Numbers have been rounded.

Factors driving the application software market include cost/performance attributes of the personal computer (with the 386, 486 and 68030 chips) versus the mainframes and minis and the client/server architecture popularity of the personal computer in distributed processing. The increasing sophistication and functionality of personal-computer-based software contributes to the forces driving the application software market.

Other inhibiting forces affecting the applications and system software market include the slowing of hardware shipments, the relative maturing of the cross-industry application market, and the confusion over a forthcoming standard in the operating system area.

D

Largest Markets

The largest personal computer application vertical market, as shown in Exhibit III-4, is banking and finance, where INPUT projects user expenditures to go from $0.46 billion in 1989 to $1.3 billion in 1994, a CAGR of 23% over the next five years. Major application areas include customer service, platform/teller automation, and executive information automation. The move from dumb terminals and dedicated word processing hardware to integrated smart workstations, providing a variety of applications on one piece of hardware, contributes directly to the size and growth of the banking and finance market.

The largest cross-industry sector for personal computer software is office systems, where INPUT forecasts the market to be $1.2 billion in 1989, increasing at a CAGR of 21% to $3.1 billion in 1994, as shown in Exhibit III-4. Applications covered in this area include word processing, electronic mail, and desktop publishing. The automation of the office as part of an integrated plan that moves from standalone word processors and intelligent typewriters to multifunction personal computers, contributes to the size and growth of the market.

Application development tools make up the largest portion of the system software forecast, as shown previously in Exhibit III-2. INPUT forecasts user expenditures for application development tools to be $1.6 billion in 1989 and $5.1 billion in 1994, with a CAGR of 26%. The transfer of applications being developed on minis or mainframes to applications on microcomputers is a major factor. There are many cogeneration and CASE tools being released for use on microcomputers. Personal computer application development tools support the cost-effectiveness of using the micro platform versus the mainframe development of applications.

E

Growth

In the area of systems software, data center management software has the highest growth of this category with a CAGR of 39% between 1989 and 1994, as also shown previously in Exhibit III-2. This growth reflects the increasing demand for software to manage the networks, as well as internetwork management software. As the number of LANs and wide-area networks (WANs) increases, it will become paramount to have software that manages these networks in an effective manner. Expert systems to manage the networks are surfacing in the market as users depend on the networks, and as network management becomes a customer service function. These expert systems use predetermined rules to troubleshoot the network and recommend courses of action to bring the network back to full functionality.

Several application software markets show rapid growth rates, including discrete and process manufacturing, wholesale distribution, and the medical and human resources markets.

EXHIBIT III-4

PC/Workstation Software Products Markets, 1989-1994 ($ Millions)

Industry Sector	1988 Actual	1989 Est.	1994 Est.	CAGR 89-94 (%)
Discrete Manufacturing	280	355	1,130	26
Process Manufacturing	50	70	225	27
Transportation	70	100	310	25
Utilities	80	105	250	19
Telecommunications	30	40	115	25
Wholesale Distribution	80	105	365	28
Retail Distribution	70	95	235	20
Banking & Finance	310	455	1,285	23
Insurance	210	295	795	22
Medical	150	205	655	26
Education	295	350	670	14
Services	120	170	515	25
Federal Government	150	205	620	25
State & Local Gov't	30	40	115	23
Other Industry-Specific	20	30	110	30
Total Vertical Markets	1,945	2,620	7,395	23
Cross-Industry Sector				
Accounting	455	635	1,650	21
Education & Training	90	120	300	20
Engineering & Scientific	130	180	555	25
Human Resources	90	135	430	26
Office Systems	930	1,210	3,135	21
Planning and Analysis	870	1,130	2,585	18
Other Cross-Industry Sector	80	110	305	22
Total Cross-Industry Markets	2,645	3,520	8,960	21
Total Application Software	4,590	6,140	16,355	22

F

Top Vendors—Market Coverage

The vendors presented in Exhibit III-5 were named by the users surveyed as being the major providers of personal computer software at the present time and likely providers over the next two years.

EXHIBIT III-5

Leading Vendors by Type of Software

Vendors		Windowing	Cross-industry
LANs	DBMSs	• Microsoft	• Lotus Development
• Novell	• Oracle		• WordPerfect
• 3Com	• Ashton-Tate		• Wordstar International
• DEC			

INPUT questioned 20 software vendors on the operating systems for which they develop software and on future plans for operating system coverage. Eighteen percent of the vendors contacted developed software for four or more of the most popular systems: DOS, OS/2, UNIX or derivatives, and Macintosh. Forty-five percent developed software for three or more of these operating systems, with 82% developing software for at least two of these systems.

All software vendor respondents were involved in developing software that would run under the DOS operating system or derivatives of DOS, as presented in Exhibit III-6. These companies were planning to continue developing applications for DOS in the absence of any other clear standard.

Sixty-four percent of vendors are developing in OS/2. Another 18% are planning to add OS/2 applications development in the next two years, with approximately 14% examining the possibilities of adding OS/2 as an operating system.

Forty-one percent of vendors are also developing for UNIX or its derivatives. An additional 27% will be adding UNIX and derivatives during the next two years, with 18% examining the UNIX market.

EXHIBIT III-6

Software Developers' Operating Systems

Operating Systems	Under current development (Percent)	Within two years (Percent)	Examining for future (Percent)
DOS (and derivatives)	100		
OS/2	64	18	14
UNIX (and derivatives)	41	27	18
Macintosh	41	15	9

Forty-one percent of the vendors develop software for the Macintosh operating system. Another 15% are planning to start development over the next two years, and 9% are examining the possibilities.

One vendor that is now developing software for the Commodore and the Atari/Amiga operating systems is planning to discontinue development efforts of application software for the Atari/Amiga over the next few years.

Vendors appear to be expanding their coverage of the personal computer software market by taking application software already written for one operating system and modifying the software to operate under one or more other operating systems. This strategy provides the vendor with wider coverage for the application for a minimum investment of development resources and capitalizes on the investment already made in the development of the application.

All users in the sample had DOS installed on their personal computers, 88% will continue to purchase additional DOS software in 1989, and 36% showed a preference for DOS.

Seven percent of the people that had DOS also had OS/2 installed on their personal computers; 12% were planning to purchase OS/2 or add additional packages of OS/2. None of the respondents had a preference for OS/2.

Users showed a preference in the education area for the Macintosh operating system: 73% of users in the education market had the Mac operating system installed, with 64% planning to purchase additional copies in 1989. In the respondent base as a whole, 30% of the respondents had the Mac system installed and 21% were planning first-time installation or additional copies of the software. Thirty percent of the educational users with the Mac operating system showed a preference for that software. Faculty and users preferred the Mac screen format and the networking capability.

Four percent of the users surveyed had the UNIX operating systems on their PCs, 30% of UNIX users will be purchasing additional copies of the operating system in 1989, and 3% of the total respondent base will be installing UNIX for the first time.

G

Market Forces

Software market drivers are presented in Exhibit III-7.

EXHIBIT III-7

Market Drivers

- Distributed processing
- Migration to networks
- Application integration
- Industry-specific thrusts
- Population growth

A major trend in the computer market is the move to distributed processing or downsizing of mainframe applications. Many users are finding the mainframe applications complex and cumbersome, thus requiring a great deal of hardware and support resources. With the advent of more-powerful personal computers and distributed processing networks, these applications can be efficiently run at a much lower cost. Large companies, such as Quaker Oats, are dismantling their IS departments in favor of distributed processing.

The migration from personal computers as standalone devices to a cooperative processing network is a driving force in the software market. Software needs to be redesigned or modified to become part of the network scheme. As discussed further in Chapter IV, personal computers are moving from isolated standalone computing devices to networked members of an information sharing or cooperative network.

There is a need for more-advanced integrated applications to run the user's business in view of the newer technology in equipment and the graphical interface and embedded intelligence areas. Since more of the mainframe work is downsizing to the personal computer level and LANs are linking multiple areas, users need integrated applications that will serve many departments and provide a total environment.

Compared to the emphasis on cross-industry general applications in the 1970s and the early 80s, a more current demand is for sophisticated industry-specific applications that will provide more complex, in-depth solutions to solve business problems and provide management with information and insight combined with the flexibility and efficiencies of the personal computer.

An example of the increased demand for industry-specific applications is related to the increased use of networked personal computer and laptops in the insurance industry. The networked PC is used to prepare policy information for clients, compare plans, and write the policies. Laptops are able to go to the customer's site to assist in the analysis of the customer's requirements, the selling of the policy, and the recording of any claim information when a claim is submitted.

The number of personal computers in the marketplace is increasing as multiple applications are run on the same equipment. Earlier this decade, the average number of applications per PC was approximately 1.5; today the average number of applications per PC is closer to 2.8. This means an increasing need for applications that are efficient and integrated.

Software market inhibitors are presented in Exhibit III-8.

EXHIBIT III-8

Market Inhibitors

- Standards
- Computing power
- Hardware saturation

Standards and the thrust for a standard operating system and a standard network protocol have users and vendors in a state of confusion. One of the factors inhibiting the market is the possibility of a standard operating system. Users are hesitating to buy personal computer software before a standard operating system is announced or defined.

Vendors are also hesitant about developing applications for the OS/2 operating systems or putting resources into the expansion of operating system coverage in anticipation of a forthcoming standard. Vendors' hesitancy to develop applications for additional operating systems is causing a lack of applications software for the OS/2 operating system.

The computing power of the personal computer is currently in a state of transition. The 8088 and 80886 PC have been in the marketplace for some time and many applications exist for this architecture. With the advent of the 286, the 386, the 486, and the announcement of a 586, users are exhibiting a wait-and-see attitude toward hardware purchases. Users are afraid to invest capital on equipment if the equipment will be outdated as soon as it is out of the box.

Software vendors are currently trying to enhance the software that they have available to take advantage of the newer chip technology and develop new software that will give them the lead in the marketplace.

Hardware saturation is a market inhibitor at this time, since many of the Fortune 1000 companies have recently completed their major buy-ins of microcomputer hardware and software. These companies have personal computers on everyone's desk and are sitting back to evaluate their efforts. This hardware saturation results in a reduction in the amount of software that will be purchased for first-time use by major corporations making large-quantity purchases.

- Development of software add-ons and enhancements, newer technology, and changes in marketing tactics will be required to keep these customers coming back for add-on purchases and upgrades to existing suites.
- The general marketing focus must now change to target more of the mid to small companies that are still in the process of first-time automation or adding more capabilities to their systems.

The search for a method to facilitate the integration of applications is an example of how one force in the industry can lead to many other forces, negative and positive. Users need to be able to integrate their applications into a total processing environment. In order to do this, the operating systems must be compatible or the applications must be interfaceable. The driving force of integrated applications has led to the inhibiting force of defining a standard operating system or network protocol. Which force will be more powerful is up for grabs at this time. If the search for integrated applications becomes more powerful, new methods of interfacing may be developed. At the present time everyone is touting his or her own type of interface—SAA, OSF, or SQL server. Vendors are trying to keep users satisfied by coverage of more than one operating system with their application software.

H

Market Opportunities

Opportunities exist in the personal computer software market for companies that provide software to interface two or more existing applications within a hardware platform or between platform sizes. As users seek to integrate more of their applications, they will be looking for software that will take the existing standalone operations and integrate the applications into a flexible total information processing system.

Opportunities also exist for software and the interfaces to provide corporatewide access to information data bases in an easy-to-use form for executives or nontechnical users. There is a demand for Executive Information Systems (EIS) to keep executive management informed as well as provide the tools for strategic planning.

I

Processing Services/Professional Services Companies—The Software Product Component of Total Offering

Many companies in the business of providing processing and professional services have spun off a portion of their software that was developed in response to customer requirements into a separate software offering. Examples of such companies are Andersen Consulting and Equifax. Andersen Consulting offers METHOD/1 and DESIGN/1, designed for internal use by the professional services staff and then released as separate products.

Equifax has long been involved in the provision of processing services to the insurance industry. Several personal computer software applications have been released to provide total coverage of the insurance industry's information requirements. Examples include the Universal Commercial System (UCS), Universal Personal System (UPS), and the EnerGraf system provided by the Enercom, Inc. division of Equifax. UCS permits mainframe access via a personal computer to provide automatic rating, quoting, and policy information. UPS automates rating and processing of policies on a microcomputer or a mainframe. EnerGraf provides graphs and charts to analyze customer energy usage and options.

IV

Issues and Trends

IV

Issues and Trends

A

Overall Issues

Overall issues in the PC/workstation software market are presented in Exhibit IV-1. One major issue is the integration of application software. The computing environment has moved the personal computer from an island of computing into an integral component of a much larger schema of total information processing. There are two types of integration that are included in this issue—integrated applications in a single type of device, and software portability between different platforms.

EXHIBIT IV-1

Overall Issues

- Integration of application software
- Networking/communications
- Solutions—not packages
- Graphical interface use

- An example of the integration of software within one device is word processing, electronic mail, spreadsheet analysis, and graphics software sharing information on the same system between the different applications. This sharing of information is transparent to the user and there are no file conversion steps between the applications.

- The sharing of information between a microcomputer and a mainframe or mini is an example of integration between platforms or the portability of the application. As many companies implement companywide sharing of information, it becomes important to be able to share data between hardware platforms.

Distributed processing has contributed to the necessity for integrated applications that allow a sharing of the processing workload as well as a sharing of information. The current most widely used method of integration is to have the applications file compatible, so that the application converts and reads information from a variety of files. The optimal method of integration takes place when an application can read or write to individual fields of the different data bases involved without major conversion of data taking place. This eliminates the hazards of file conversion and makes the application more efficient to run.

Another issue in the software area is networking and communications between devices. Not only do like devices have to communicate with each other, but they have to be able to communicate with noncompatible devices and platforms.

- For example, an IBM personal computer can gather information, analyze the data, and write a report while the report is actually being typeset on an Apple running desktop publishing software. The IBM PC needs an efficient method of communicating its files to the Apple for the production of the report without time-consuming conversion of files.

- Communications between the personal computers, minicomputers, and the mainframe in a distributed processing environment are necessary. Each platform contributes the processing that is best suited to its configuration and information sharing creates and increases the value of this total environment.

A third issue is the need for solutions to information requirements, not piecemeal applications packages. Departments and devices should not be considered separate islands in the total information processing requirements scheme. The current environment includes information being processed and stored on many compatible and noncompatible platforms and devices. This process needs to be rationalized as an integrated system that meets all of the information needs of the company and is a total solution.

Graphical interface use has become an issue that needs to be addressed by all device manufacturers and software developers. Users have seen the benefits of the use of graphics to provide application assistance and are demanding more of the advantages for other applications that are being run by the nontechnical user. Windowing has made it easier to keep track of multiple applications being accessed at the same time. The mouse method of choosing and running applications has saved keystrokes and made applications easier to run from option menus.

1. User Trends

An important user trend in personal computing, as shown in Exhibit IV-2, is the move from the personal computer as a standalone device to a component of a cooperative network. Users surveyed described approximately 58% of their personal computers installed at the end of the year 1988 as standalone devices, 23% as linked to the mainframe, and 19% as linked to other personal computers through LANs, as shown in Exhibit IV-3. In 1989, the percent of personal computers connected by LANs is expected to increase. Users expect, by the end of 1989, to have 36% of their personal computers linked through LANs. The percent of micros linked to mainframes is expected to remain about 25%, but the percent of personal computers utilized as standalone devices will decrease to approximately 39%.

EXHIBIT IV-2

User Trends

- Information sharing
- Cooperative processing
- Multiple applications
- Integrated software

The largest shift will be seen in the insurance industry, where the number of personal computers installed as standalone devices will drop from 89% of the surveyed installed base in 1988 to 33% of the base in 1989. The number of personal computers connected through LANs will increase from 4% of the installed base in 1988 to 60% in 1989.

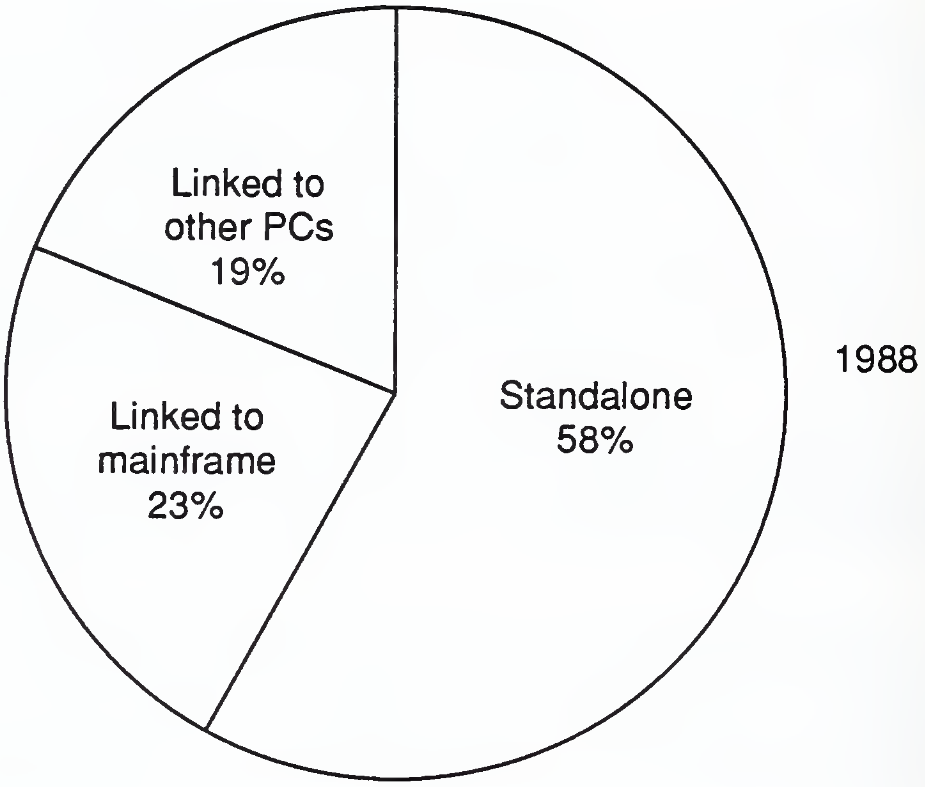
- Reasons behind this trend include laptops being linked by networks for the insurance agents in the field to access customer information and policy information, and the use of laptops to facilitate the underwriting of policies and the processing of claims.

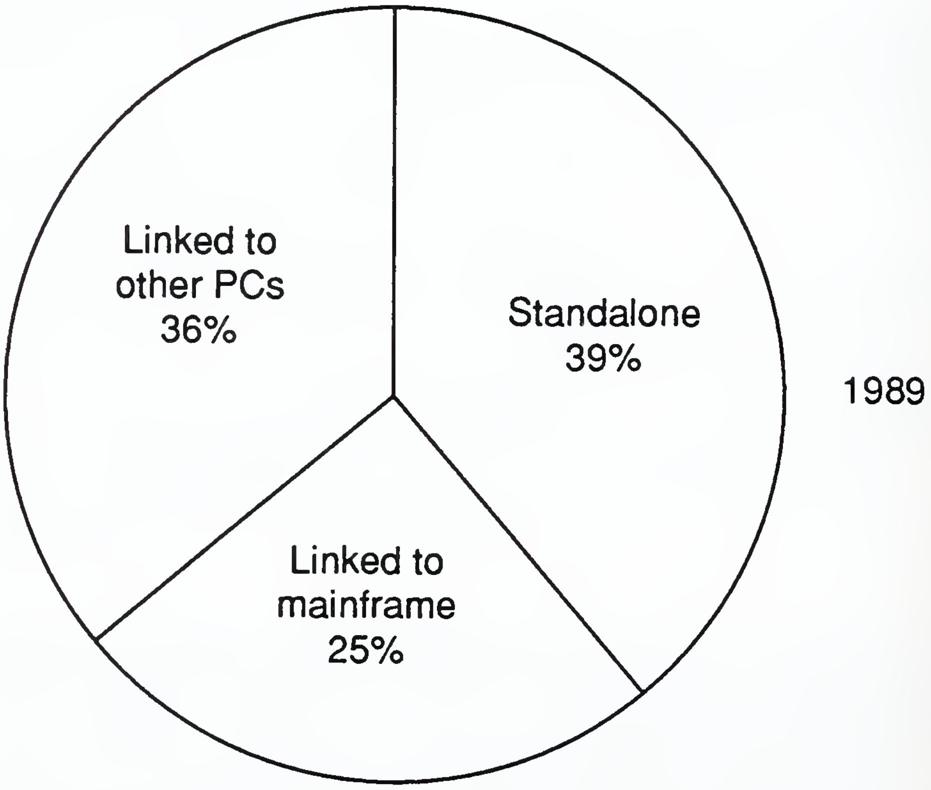
- The interviews revealed that the perceived value of distributed processing in the insurance industry was a contributing factor to the increased percentage of personal computers linked through LANs.

Cooperative processing is another trend affecting the microcomputer market. Distributed processing is being seen as a viable alternative to the large mainframe-based data processing area. Companies are investigat-

EXHIBIT IV-3

User PC/Workstation Installed Configuration





ing the feasibility of disbanding the computer center and distributing the workload over many work group areas that share the processing and information throughout the organization

Users are starting to realize the cost-effectiveness of the personal computer by increasing the number of applications installed on their micros. In the early 1980s, the basic software configuration of the personal computer was one operating system and one application per machine. With the availability of hard disks, users were able to install more than one application at a time. Graphics packages, statistical packages, and industry-specific packages were added to increase capabilities. And additional utility, disk management software, and other system software was added to manage the new capabilities.

Exhibit IV-4 presents the average number of applications per microcomputer, as obtained in the INPUT interviews. The overall average number of applications per micro is approximately 2.8. This number does not include additional utilities and other system software.

EXHIBIT IV-4

Applications Per Personal Computer
(67 Respondents)

Industry	Number of Applications	Range
Banking	2.9	(2 - 5)
Education	2.4	(2 - 3)
Finance	3.2	(1 - 8)
Insurance	2.3	(1 - 4)
Manufacturing	3.1	(2 - 6)
Other industries	2.8	(1 - 5)

The increase in the number of applications per machine has increased the demand for integrated applications. Users want to be able to do multiple tasks with the data without having to reload the same data into various incompatible file formats. Cooperative processing also requires the ability to update and process multiple applications with information being read or written to various file formats that may or may not be compatible. The application developers are challenged to make their file formats compatible with those of complementary applications or provide an easy interface to other applications.

2. Vendor Trends

Vendor trends in the PC/workstation software market are presented in Exhibit IV-5.

EXHIBIT IV-5

Vendor Trends

- Integrated approach/compatibility
- Search for standards
- Support as differentiation

Many vendors are in the process of providing an integrated approach to their line of products. They are starting to meet the requirement for an integration of complementary products by developing software that is file format compatible to other applications. This move seems to be placating the user until a standard interface is developed that will make these applications more compatible.

Most vendors are supportive of a standard operating system or network protocol in the software market that will provide users with the compatibility they need and still retain the vendor's individuality and preserve market share. In the absence of a standard operating system, most vendors interviewed are developing applications for other operating systems besides the DOS environment, as shown in Exhibit III-6.

Vendors are starting to differentiate themselves in the market by adding additional support features and tailoring the support they give to their customers. WordPerfect has been extremely successful in the support area with its toll-free hotline. Other features that vendors are adding to support include vendor-coordinated user groups, seminars, bulletin boards, newsletters, and journals.

With the widespread use of modems, bulletin boards have become an important means of communicating between users. Software fixes as well as printed information can be easily transmitted to users through the bulletin board services. Bulletin boards may be a part of third-party services (for example, Compuserve), or the vendor may have its own bulletin board service that the user accesses directly.

B

Funding Sources

Vendors obtain the resources for research and development of new software products from many sources, as shown in Exhibit IV-6.

EXHIBIT IV-6

Funding Sources

Product Research and Development

- Internal
- Vendor joint development
- Client joint development
- Acquisitions/Mergers
- Sales/Marketing ventures

Over 95% of the vendors surveyed obtained their R & D funding from internal sources. Companies such as Lotus Development, Microsoft, and WordPerfect use internal profits to fund the growth of the company through the development of new products, enhancements of existing products, and increased customer support.

Other methods mentioned by vendors include teaming and joint development of products with other vendors, investors, joint development with clients, and acquisitions of companies with existing products that meet market demand.

- Joint development appears to be a popular method between noncompeting companies or companies with complementary products. Such companies join together to develop a new product that will benefit both companies as an enhancement to the existing product suite.

- Companies also team with clients to develop a custom software application for the client and then market that solution to other companies with the same situation or need.

- There are many advantages for each party in a joint development effort undertaken by a software developer and a client company. The vendor has access to industry people to provide the practical functionality of the product. The client provides a beta site for testing and usage. The client is able to get a custom software application at a reduced cost and the prospect of royalties after the application enters the open market. These royalties offset the original cost of development.

Some vendors act as the marketing, sales, and support function of smaller applications developers that are limited by resources, staff, or expertise. The vendor acts as a manufacturer's representative in that the vendor sells products developed by many firms as well as the vendor's own products. The application developer has the advantages of a staff to market and support the products without the added overhead or other costs. The sales and marketing vendor may have a multitude of products developed by various small developers that interface to create an integrated application system for prospective buyers.

Once the vendors develop or enhance the software, the user obtains the software through many different channels. Users were questioned about how they obtained their software, through what channels they expected to make their future purchases, and their preferred channel. The percentages given in Exhibit IV-7 represent the average amount of software purchased through that channel for the users mentioning the channel. For example, of the users that obtained microcomputer software through the MIS department or Info Center, an average of 85% of their software was purchased through this channel. The purchasing area provided over 76% of the software for users that obtained software through the purchasing department.

EXHIBIT IV-7

Channels Through Which Users Purchase Software

Channel	Current Amount * (Percent)	Future Expectations (Percent)	Preference ** (Percent)
MIS Dept. or Info ctr.	85	85	30
Purchasing area	76	76	25
Retail	51	52	14
Direct	43	48	10
VAR	29	29	5
Mail order	28	32	5
OEM	26	26	-

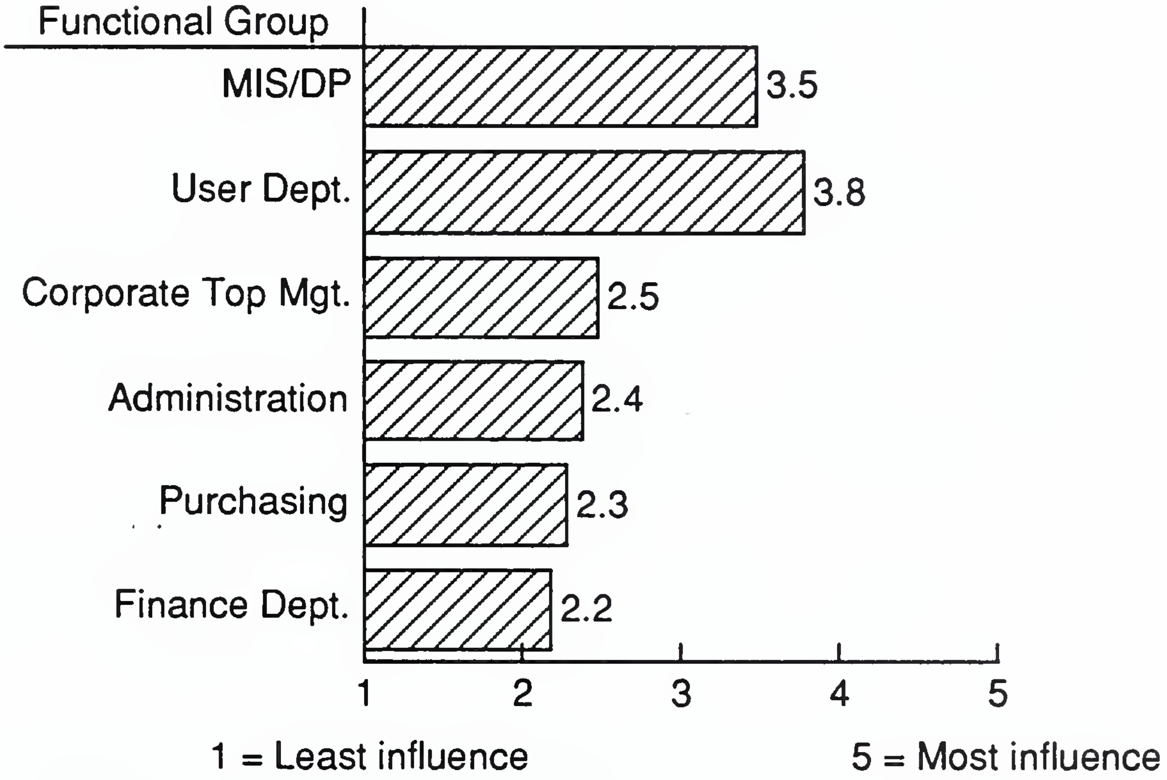
* Mean percent of software obtained/expected to be obtained through the channel by respondents mentioning channel

** Percent preference by respondents mentioning use of channel

Users were questioned regarding the influence various functional groups in their organization had on the purchasing decision, as shown in Exhibit IV-8.

EXHIBIT IV-8

Influence on Purchasing Decision



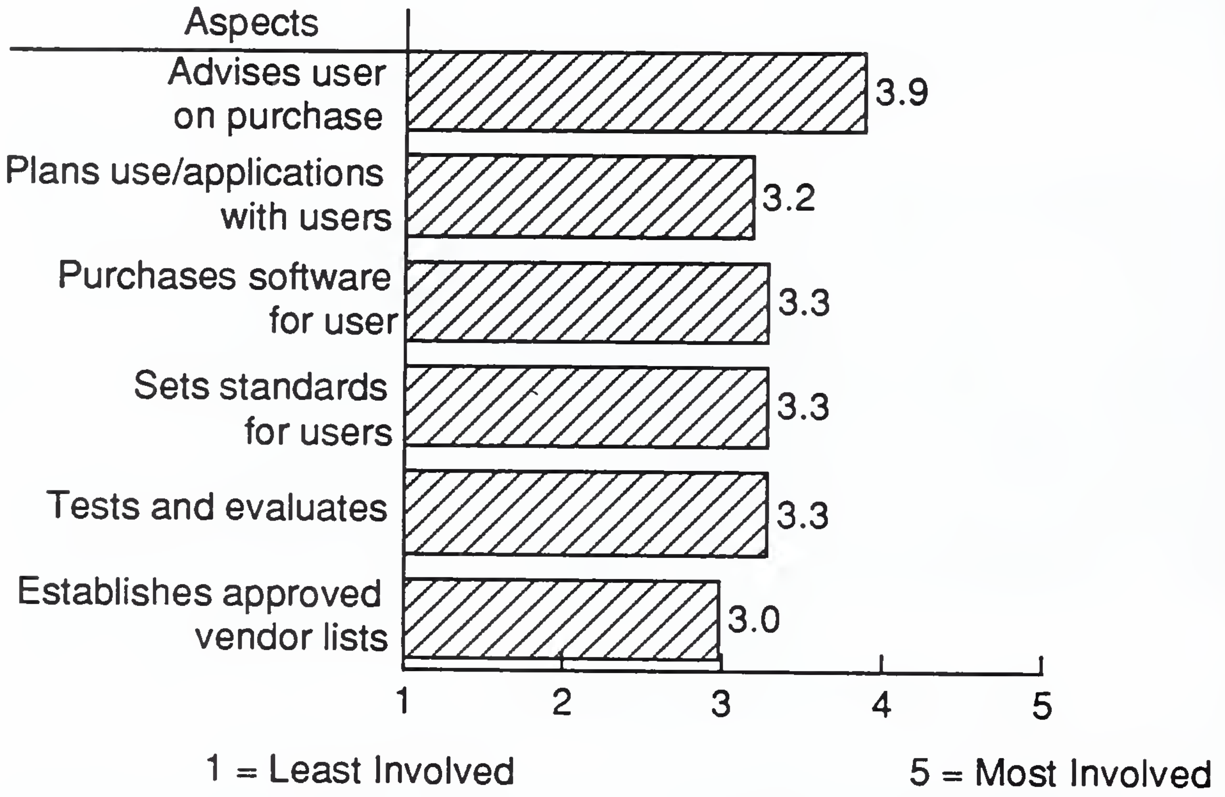
The purchasing decision appears to be most influenced by user department and their choice of software. User choices are closely followed by the MIS or Data Processing department, with an average influence of 3.5. The focus appears to be on the user's defining information requirements and having more impact on how needs will be met. This focus is further shown by Exhibit IV-9, which presents the degree of involvement MIS or Data Processing has on the key aspects of software purchases.

The MIS/DP department still appears to have a moderate to high involvement in the aspects of the software purchasing decision by the users. On the average, it has the highest involvement in advising the user on purchases, with a mean rating of 3.9.

The lowest area of involvement in the purchasing decision is in the area of providing an approved list of vendors for software. Producing actual

EXHIBIT IV-9

Degree of Involvement by the MIS/DP Area



lists of approved vendors may not be as important as working with the user to examine the possibilities and determine exactly what is the best software for the users needs. Providing an approved list has a slightly higher rating with the larger firms having more than 100 employees where it is less feasible to sit with each user area.

C

New Applications and Improvements

A preface to user requirements for future software would be an examination of the current mix of hardware and software to examine their effects on the software market and to enable better estimates of requirements for the future.

INPUT interviewed 67 users regarding their personal computer hardware and software installed as of the end of 1988. They were also questioned on the personal computer hardware and software they expected to have installed as of the end of 1989. Respondents were requested to give the brand name of equipment installed and to list the top two vendors of software installed. The installed base of brand name equipment is presented in Exhibit IV-10, installed system software in Exhibit IV-11, and cross-industry software in Exhibit IV-12.

EXHIBIT IV-10

Installed Equipment Base

Percentage Brand	Percentage Installed 1989 (Percent)	Planned by EOY 1989 (Percent)
IBM PC	34	28
IBM PS/2	24	24
Compaq	9	9
AST	7	6
Other IBM-compatible	14	13
Apple	6	6
Hewlett-Packard	2	2

EXHIBIT IV-11

System Software Installed

System Software	Percent of Respondents EOY 1988	Percent of Respondents EOY 1989	Top Vendors
LANs	39	48	TOPS, PACER, IBM, Apple, NOVELL, 3COM
			Micro-Mainframe
Links	48	51	IBM, Columbia DCA
Security Systems	13	13	Pyramid
Windowing Systems	25	27	Microsoft, MicroGraf
DBMSs	67	70	Ashton-Tate Oracle, Informix
CASE	9	9	*
4GLs	12	12	*
Utilities	54	54	Norton, Central Point

* No clear leader shown.

EXHIBIT IV-12

Cross-Industry Software Installed

Cross-Ind. Software	Percent of Respondents EOY 1988	Percent of Respondents EOY 1989	Top Vendors
Accounting	19	22	*
Human Resources	12	16	*
Education/Training	24	27	*
Project Mgmt.	21	25	Symantec
Financial Planning	19	21	Lotus
Planning/Analysis	79	82	Lotus, Microsoft
Engineering/Scientific	19	19	*
Business Graphics	46	46	Harvard Bus.
Graphics			
Word Processing	81	82	WordPerfect, Ashton-Tate, Wordstar Int'l.
Desktop Publishing	46	49	WordPerfect

* No clear leader shown.

IBM had a clear edge in all of the markets surveyed for brand name personal computers installed in 1988. Apple and Hewlett-Packard were close behind IBM's lead in the number of personal computers installed in the education market; AST personal computers made a strong showing in the manufacturing market.

Seventy-six percent of the users surveyed did not expect to change the brand of their personal computers installed in 1989. However, the reasons given by those planning a change of brands include: architecture/ technology preferences, vendor financial difficulties, quality problems with the devices, and—most importantly—price/performance preferences.

Users surveyed also expected a overall growth of approximately 25% in the number of personal computers installed by the end of 1989. (This is more optimistic than industry projections for a 13% growth rate in shipments in 1988). This growth was explained as an increase in demand for the processing capabilities provided by personal computers, an increase in distributed processing, and new applications linked to the network. This increase in the number of personal computers installed will lead to an increased demand for application software that will increase the productivity of the user.

A combination of LANs and micro-to-mainframe links was found in 28% of the companies interviewed. By the end of 1989, this percent is expected to increase to 33% of the companies. The number of installations of LAN software for the users surveyed was expected to grow at 23% to 48% of the sample population.

Word processing and planning and analysis software head the list of cross-industry personal computer software installed by the users interviewed. Word processing software was installed at year-end 1988 on personal computers at 81% of the sites surveyed; this percent of sites installed was expected to grow at a slow rate during 1989 to 82% of the sites. Top vendors mentioned in the areas of word processing and planning and analysis software included WordPerfect, Ashton-Tate, Wordstar International, Lotus Development, and Microsoft.

A total of 13% of the users interviewed had some type of industry-specific software on their personal computers at the end of the year 1988. Approximately 16% of users expected to have industry-specific software running on personal computers by the end of 1989. In user responses there were no clear indications of the top vendors in these markets.

Users were questioned on what features were missing in the software that they had on the personal computer. Exhibit IV-13 lists the features that users found to be missing or lacking in current software.

There is a tremendous thrust for the integration of software to support the business functions of industry. The feature mentioned most often in talking to users about missing features in current software is integration of software applications. There needs to be a standardization of software interfaces or compatibility to provide an easily accessible total work environment for the user—horizontally and vertically throughout the organization.

- A standardized link between the mainframe and the micro would facilitate the sharing of information. Each device would handle the processing most suited to its capabilities.

EXHIBIT IV-13

Features Missing in Current Software Products

- Integrated software
- Integrated support
- Graphic user interface
- Better use of memory/technology

- Users are expressing a need to share information across application lines. The sharing of information between applications eliminates multiple entry of data and increases productivity.

Integrated application support is another area in which users would like to see improvement. Users want part of the support function of training and installation included with the application. More users are less technically-oriented and more dependent on the help facility.

Graphic user interface between hardware and the application software is also on the users' wish list. Users want to see more applications with the look of the Macintosh operating system. They like the Macintosh's pull-down windows and mouse control of the keyboard. Menus are extremely important to nontechnical users who find it easier to work with a menu than a directory.

Applications taking full advantage of the recent advances in hardware and software are on the users' list of requirements. Examples include more software that incorporates Presentation Manager and Windows with the application. Users don't want to wait two or three years for applications to catch up with advances in equipment and software technology.

D

Total Solutions/ Bundled Marketing

There has been a proliferation of marketing agreements that bundle complementary hardware and software to provide a total solution to the user. Printer manufacturers are jointly marketing printer and special printer control software that will enable the user to gain full productivity quickly. Manufacturers are making enhancements to the basic printer software that will make the printer more valuable in terms of capabilities.

Personal-computer vendors are forming joint relationships with developers of third-party software to create the "total solution" system for users. Software developers are frequently forming relationships with other vendors. Together, they will offer rebates and discounts for the purchase of two or more complementary products.

Conducting seminars about multiple products and services is another method of increasing exposure in the marketplace. These joint marketing programs help to increase exposure to prospective clients and further prospects' knowledge of integration of products. Vendors are also able to capitalize on each other's client lists.

E

Entry of Service Companies into the Software Market`

Announcements have been made by Digital Equipment Corporation, Hewlett-Packard and Sorbus extending the coverage of service agreements to application software maintenance. This extension will provide more coverage for users to maintain applications, as well as the hardware under service agreements. With the redirection of the MIS function in many companies, this maintenance of application software fills the gap for users to keep applications up and running.

Service companies maintaining applications as well as hardware will need to address how they provide maintenance on the variety of applications in the market. Customized applications will also present some difficulties for the company covering the application maintenance.

F

Impact of Large Computer Systems Vendors on the PC Market

The large computer vendors have always had a definite impact on the personal computer market. It is hardware vendors that define the technology offered to the user. The vendor that releases the leading-edge technology and is able to integrate that technology into user systems controls the market. IBM has long been the standard in the business-personal computer market. Apple and Commodore released, at about the same time, personal computers geared to the education and home entertainment markets. By providing practical applications for the business market, IBM was able to gain control and define the standard for the compatibles to follow.

Through forming relationships with the software developers, large manufacturers retain their control of the market and the standards. Many developers are presently fighting for the control of the market standards in operating systems and networking and communications protocols. It is the vendor that provides the most complete capabilities to the users in a timely and easy-to-use manner that will gain control of these standards.

G

Software VARs—Alternative Marketing Approaches

Resellers add a variety of services or products to existing software. A VAR can combine the software of many vendors with specialized hardware components to create customized systems for users. One of the more common forms of customization is combining printer software with the printer to increase the user's startup productivity or increase the capabilities of the printer. Many printer manufacturers offer downloadable font software that enhances the value of the hardware. Another type of offering combines tools from different developers that complement each other and form a more complete development system.

Another type of offering modifies and enhances off-the-shelf applications development software or data base software to create a total application directed at a specific industry or cross-industry segment. Many DBMS vendors are developing generic data base management software targeted to the VAR channel. VARs are using this software to develop applications directed at specific markets. In this way, the vendor can attain a wider distribution of its products within a specific industry. Vendors are targeting their support and new products to these software developer VARs and counting on them as a major distribution channel.

H

Open Systems Architectures

The thrust for application interconnectivity between platform sizes and within the platform presents a case for open systems. Vendors are starting to provide software to support these architectures, but at the current time, with the confusion over standards and which standard to support, progress appears slow.

I

Standards

As previously mentioned, standards are still evolving in the microcomputer software market. Users want standards to facilitate application interconnectivity. Software vendors are either promoting their own software as a standard, covering all of the standards with their software, or waiting to see what will emerge as the standard before investing resources into new software development. Adherence to standards will be a requirement for competitive viability in the longer term. Standards in the process of development include:

Screen	Windows, Presentation Manager, NeWS, NewWave, Display Postscript
Communications	OSI, SNA, Ethernet, Token Ring, TCP/IP
DBMS	SQL, DB2
Printers	Postscript
Operating Systems	MS-DOS, OS/2, UNIX

The major confusion over standards reigns in the area of operating systems, where users are hesitating over new purchases and vendors are hesitating in the area of new applications development. Each of the operating systems being proposed as the standard has its merits and limitations depending on the application and the hardware and company environment.

J

New Technologies

There is a lull in the market at this time for the applications that make use of X Windows and Presentation Manager capabilities. Vendors have provided the top-down interface or systems software that address the requirements of the users for an easy-to-use graphical interface. But, there exists a need to build the middle—the applications that make use of this capability. Much of the software now available is used as tools to build the applications. Applications as ready-made products are in high demand and short supply at this time. This lag in the use of the available technology provides many opportunities for vendors to supply practical applications that will take advantage of graphical interface capabilities.

The technology for the X-Windows and Presentation Manager poses some unique problems for the developers of application software. At the present time, these are new technologies and have not yet attained the functionality developed for older systems software. When the software becomes more efficient to run and the cost and time required to develop applications is reduced, more applications developers will be willing to invest and develop applications to utilize these interfaces; thus the cost and time involved to develop the applications will be reduced.

Development problems facing the application developers trying to make use of Windows and Presentation Manager include:

- The X standard encompasses a broad set of protocols, making the X application too large and complex to build quickly.

- There is confusion among vendors and users as to what the standard operating system for personal computers will be: DOS, OS/2, or UNIX. Nobody wants to dedicate resources to developing or purchasing applications software that isn't standard.

K

Networking Solutions

The use of networks in the personal computer environment has become close to a necessity for companies of every size. Forty percent of surveyed users had LAN software installed in 1988, 18% were planning new installations in 1989, and 63% of those with LANs were planning to expand.

The migration of personal computers as standalone devices to networked components of a processing scheme has resulted in many other concerns and issues. There is a proliferation of definitions for the types of processing networks as well as the types of components in the network. The networking environment is evolving, and with that evolution, definitions of systems are growing out of the uses and configuration of the systems. The many types of distributed processing and cooperative processing networks include the following:

- One type of distributed processing network is composed of personal computers connected to a mainframe or minicomputer or multiples. The personal computer shares files or data base access with the host computer, usually through a type of 3270 terminal emulation configuration.

- The cooperative processing network shares processing of the information, as well as access to files and data bases. Cooperative processing models include client/server, LAN to LAN, and peer to peer.

The client/server model usually consists of desktop computers (clients) with front-end communications and application interfaces to personal computer workstation, minicomputer, or mainframe servers. Servers provide shared data base and/or application access by desktop-based client machines, as well as access to other data bases and applications on the networks.

LAN-to-LAN processing shares files and information within the LAN and also with neighboring LANs. Each LAN performs processing within the configuration and then shares the files and data bases with the other LANs.

Cooperative processing will eventually move toward the peer-to-peer processing model in which the applications layer runs independently on each platform. Such a processing environment exists when the application is resident on different size platforms and each performs the portion of the processing that is most efficient for its configuration.

One of the major issues concerning applications or applications development in the networked environment is multiple users updating and accessing the same information at the same time.

In the CASE development area, companies have experienced delays in updates being incorporated into data bases used for product development when development products are run on a LAN. In the CASE environment, multiple users are trying to coordinate a design based on input from many other people in the organization. Control and management are the most important issues to consider when planning distributing processing with development tools such as CASE.

Another issue is software available for use in the LAN environment. Most application software is written as single-user packages. Many of the vendors such as Harvard Graphics have announced the impending release of network versions of their most popular application software packages. With the increase in the number of installed LANs, vendors will be responding with LAN versions of software or incorporating the attributes specific to the LAN versions into the regular software, making it single-user or LAN software.

V

Competitive Environment

V

Competitive Environment

A

Competitive Strategies

Software vendors have had to develop many different strategies to remain competitive under rapidly changing market conditions. They have sought to form relationships that will increase their exposure and expand their penetration of the market. They have also tried to differentiate themselves from the competition to retain product recognition and assure themselves a place in the user's brand preference. All of these strategies or some combination thereof have led to the success of some vendors and the continual struggle of others in the software development area.

Exhibit V-1 presents some of the most common strategies mentioned by the vendors in our research.

EXHIBIT V-1

Vendor Strategies

Product
- Leading-edge products
- Integrated products

Support
- Client support
- Channel support

Marketing/alliances
- Joint marketing
- Alliances

The first of these strategies has to do with the products themselves—what is developed and how it is developed. The most basic strategy is to provide the best possible software products to the users. Staying on the leading edge of technology and application features has to be the most important aspect of being successful as a software provider. The products must take advantage of the most current technology, as well as provide the user with high levels of ease-of-use and valuable functions for the intended purpose.

The second product strategy is providing integrated products that cover the customer's universe with as many integrated applications as possible—to run between incompatible devices, within platform size groups, or among different platforms. In cases where vendors have concentrated on one or two applications, these vendors have provided applications that can port to other platforms or provide the application with file-compatible interfaces to other noncompatible application software.

Support strategies relate to the way that the vendor supports products after they have been developed. The first support strategy is actual client support in terms of centralized technical support, education and training, seminars, consulting and application planning, and software fixes and upgrades. Exhibit V-2 presents the vendor responses concerning the types of support services provided to customers.

Vendors are currently offering many services that provide customers with complete coverage of their support needs. The greater majority of the services are being offered for a fee, with some of the most basic services such as centralized support being offered free, or free during a limited time period and then for a fee on a continuing basis.

- Centralized support and software fixes and upgrades were the two top support services rated by the vendors in mean value to their customers. Centralized support was most often offered free during a specific time period or free at any time. Approximately 23% of the vendors did offer centralized technical support or hotline services for a fee only.

- Purchased training outnumbered free training in terms of the number of vendors offering these services. But training was rated as being of higher mean value to customers when it was free from the software vendor.

- Custom software and consulting are being offered by a majority of the vendors and seem to be rated fairly high in terms of value to paying customers.

- The majority of vendors offered software fixes and upgrades for a fee or free during a limited timeframe. These services were rated as being of substantial value to customers.

EXHIBIT V-2

Vendor Software Support Offerings
(22 Respondents)

Service	Fee (Percent)	Free (Percent)	Free with limit (Percent)	Value *
Centralized support	23	27	45	fee: 5.0 free: 4.5 fee/free: 4.1
Free training		27		free: 4.2
Purchased training	73			fee: 3.9
Custom software	59			fee: 4.2
Consulting	64	5		fee: 3.8 free: 4.0
S/W Fixes	32	50	5	fee: 4.4 free: 4.6 fee/free: 5.0
Upgrades	68	9	23	fee: 4.5 free: (not rated) fee/free: 4.5

(Percentages may not add to 100% due to "No Responses.")

* 1 = Least Value; 5 = Greatest Value

From the customer point of view, users were questioned regarding the same elements of support and their rating of value for these support services.

There appears to be a slight difference in the way that the vendor viewed the value of support to customers and the value that the user placed on each aspect of support. The vendor and user ratings are compared in Exhibit V-3. The top three items valued by each group are the same. Both groups valued software fixes, upgrades, and centralized support as being the most valuable in terms of training and support supplied by vendors.

EXHIBIT V-3

Software Support Ratings

Offering	User Rating *	Vendor Rating *
Centralized support	3.1	4.5
Free training	2.6	4.2
Purchased training	2.0	3.9
Custom software	2.1	4.2
Consulting	2.7	3.8
S/W fixes	3.3	4.6
Upgrades	0.6	4.5

* 1 = Least Value; 5 = Greatest Value

The differences are shown in the mean ratings given to consulting, free training, purchased training, and custom software. Users rated consulting fourth-highest, while the vendors gave consulting the lowest mean rating. Free training and custom software were rated in the same order by both groups. Purchased training was given the lowest or near lowest rating by both groups.

This information implies that users desire and value consulting services from software vendors, to a greater extent than the vendor perceives.

Vendors appear to be responding to users with the types of training and support planned for the future. Exhibit V-4 presents the improvements in training and support as listed by our user respondents and the offerings vendors have planned to meet user requirements.

Both groups are concerned with the area of technical support. Users require staff that are more knowledgable and that provide better service when the calls come in. Vendors should attempt to improve service by increasing the number of staff, increasing staff competency, adding support locations, and adding centralized “hotline” phone systems.

Specialized channel support and separate divisions providing related professional services for software users are other areas in which vendors

EXHIBIT V-4

Training/Support Improvements

User Requirements

- Support
  - More-knowlegeable staff
  - Better service
  - Documentation
- Training
  - Tutorials
  - Independent study (CAI, video)
  - Free training
  - Seminars/workshops
  - Others (real trainers, yearly retraining, train the trainer)

Vendor Offerings

- Support
  - Increased tech support
  - Bulletin board/users' groups
  - Channel support
  - Professional services divisions
- Training
  - Increased quality emphasis
  - Regional
  - Specialized
  - Independent study (books, tapes, CAI/CAT)

are implementing solutions to support issues. Vendors are focusing channel support offerings to maximize the potential of each. Professional services departments or divisions address the specialized consulting and support services required by users.

Vendors believe the need for user training and support will increase over the next several years. Exhibit V-5 presents vendors' views of reasons for movement in user requirements for training and support.

On the whole, 95% of the vendors interviewed believed that the need for training and support was going to increase or stay the same. One of the primary reasons was the type of user requiring training and support; the less-sophisticated user needs more services to become proficient. The

EXHIBIT V-5

Vendor Views on User Requirements

- Increase
  - 68% of respondents
  - Less-sophisticated users
  - Software complexity/integration
  - More software on market
  - Users demand more services
- Remain the same
  - 27% of respondents
  - Software more straightforward
  - Meeting needs of steady base
  - Third-party providers
- Decrease
  - Software user-friendly qualities

complexity of the many software integration options and the number of different software applications confronting the user contribute to the continuing need for training and support services.

Some current software available is more straightforward and easier to use without extensive training, resulting in companies believing that their training requirements from users will remain about the same. Third-party providers also help to keep the user training requirements at a steady base.

Overall, users see their demand for training and support increasing or remaining the same over the next several years. The reasons cited are shown in Exhibit V-6.

Many of the reasons given by users are related to those seen by vendors. The software complexity and the computer novice trying to become proficient are the main factors contributing to an increase in the demand for training and support in the future. The in-house staff is able to offer only supplemental training and support.

EXHIBIT V-6

User Training Requirements

- Increase
  - 47% of respondents
  - Software complexity/sophistication
  - Lack of in-house time or skills
  - Introduce new users
- Remain the same
  - 36% of respondents
  - In-house support supplement
  - Third-party providers
- Decrease
  - 17% of respondents
  - Better documentation
  - Software user-friendly qualities
  - Market training products
  - Third-party providers

In cases where third-party providers can support the in-house staff, users project the requirements for software vendor services to stay about the same or decrease.

Improvements in the user-friendly features of software, in documentation, and in the amount of available training products on the market contribute to a decrease in the dependence of the user on the vendor for training and support. Approximately 17% of users interviewed saw their dependence on the vendor for training and support decreasing due to these factors.

Users are still basically dependent on software vendors for many of the services they require. Users were queried on the improvements they would like to see in the areas of training and support; the results are shown in Exhibit V-7.

EXHIBIT V-7

User Training and Support Improvement Requirements

- Training
  - Independent study
  - Tutorials
  - Free training
- Support
  - More-knowledgeable staff
  - Documentation
  - Responsive services/hotline
  - Free support

The two items mentioned most often were providing independent study tools and additional, knowledgeable staff to respond to users' requests. Suggestions for types of independent study aid included instruction on the personal computer in the form of computer-assisted instruction (CAI) and tutorials. Video instruction was also mentioned as an option by which users would be able to learn the software at their own pace and at a convenient time.

Additional and better informed staff was the second most often mentioned item by users as a vendor area of improvement. Users voiced a concern for the number of vendor support staff and its quality. More-responsive services ties in with the concern regarding the number of staff responding to users. Users said that better hotline response times on questions was the chief area of concern.

Users that depend on the vendor for training and support appear to be concerned about the quality of services offered by vendors. Many users felt that they paid enough for the software to cover the costs of these ancillary services. Users do not believe they should have to pay extra for support and basic training after purchasing the software.

B

Characteristics/ Functionality of Successful PC Software Products

To better examine the characteristics of a successful product, one must determine the characteristics important to the user. Exhibit V-8 presents user importance ratings of common characteristics of software.

The characteristic with the highest mean rating (4.5) was IBM compatibility. At the present time IBM seems to be the standard architecture in the market, with IBM and compatibles making up over 75% of the personal computer market reported by our respondents. It is extremely important to users that they can obtain IBM-compatible software with the required functionality.

EXHIBIT V-8

Importance of Software Characteristics

Characteristic	Mean Importance *
Price	3.3
Vendor reputation	3.9
Support by vendor	3.7
Support by dealer/dist.	3.0
Software performance	4.4
Software features	4.2
Ease of use	4.1
Ease of training	3.6
Micro-mainframe links	2.5
Interfaces to other software	3.0
Documentation	3.7
Security features	2.6
IBM compatibility	4.5
Source code available	1.8
Vendor financial stability	3.0
Lack of copy protection	3.4
Site Licensing	3.4

* 1 = Least important; 5 = Most important

The second most important characteristic appears to be software performance, which had a mean rating of 4.4. As users expect more efficiencies from using personal computers and the micro becomes an integral part of the workplace, the drive for performance and maximum efficiency becomes paramount.

Software features and ease of use—with ratings of 4.2 and 4.1 respectively—appear to be important to the user, but these ratings also imply that users may be willing to compromise in favor of compatibility and performance.

Vendor reputation, support, and documentation also rated fairly high, with reputation receiving a rating of 3.9 and support and documentation receiving 3.7.

With the lowest rating of 1.8, source code availability does not seem to be an issue with the personal computer users interviewed. In the past this feature was important to users that had a formal MIS programming area and worked with midsize and mainframe applications. Programmers would modify the source code to their particular specifications. With the low involvement of the MIS areas and the downsizing of the applications, there doesn't appear to be an environment that requires code for modification.

Respondents were also questioned regarding the problems they experience with existing software. They were asked to rate the extent that each of these items represents a problem on a scale of one through four, where one is not a problem, and four is a severe problem. The mean ratings are shown in Exhibit V-9.

The lowest rating of 1.4 was for usefulness of the software for the intended purpose. Users appeared to understand the advantages and limitations of the software at the time of the purchase decision, thus minimizing surprizes after the software was installed. Installation of the software received another low rating of 1.5, signifying a minor problem.

Documentation clarity and organization and vendor technical support rated the highest (2.1) on the scale of one through four for perceived extent of problems with current software. These ratings confirm the improvements in software support suggested by users in Exhibit V-4. Users appear to see a lack or shortcoming in available documentation. This situation may be due to differences in the actual level of sophistication of the user and the level anticipated by the vendor when developing the documentation.

EXHIBIT V-9

Software Problems

Problem	Extent of Problem
Usefulness for intended purpose	1.4
Documentation clarity	2.1
Documentation organization	2.1
Installation	1.5
Vendor/technical support	2.1
Ease of use	1.9
Performance	1.8
Compatibility with other software	2.0
Micro-mainframe links	1.7

Based on the importance of software characteristics and problems with current software as rated by the users, Exhibit V-10 presents a profile of a successful software solution.

EXHIBIT V-10

Successful Software Product Profile

- IBM hardware/software compatible
- Performance exceeds expectation
- Features specific to application
- Generally expected features (graphical interface, windows, etc)
- Ease of use for all levels of user sophistication
- Highly reputable vendor
- High level of vendor support
- Documentation clear and well organized
- Low time commitment to train on software
- Copy protection not an encumbrance
- Site licensing available
- Competitive price
- Easy installation

Product marketing and positioning is as important to users as is the development of the product itself. When talking with users regarding personal computer software and services required and received, INPUT also discussed sources for information on new applications. Exhibit V-11 presents the channels of information most used by respondents to learn about new applications.

Trade journals and magazines appeared to be the most widespread channel through which users acquire information on new applications. Eighty-eight percent of the users contacted learned about new applications or vendor information through trade journals or magazines. The information appears a second time during the informal discussions in-house where users discuss applications or the newest information on personal computer software, with 19% of the users mentioning this channel. Word of mouth from users outside of the in-house staff accounted for another 10% of the items mentioned.

EXHIBIT V-11

New Application Information Channels

Channel	Mentioned by Respondents (Percent)
Trade journals/magazines	88
In-house—users/MIS	19
Vendors/suppliers	13
Direct mail	13
Word of mouth	10
Seminars/conferences	6
Consultants	3
Trade shows	3
Other	3

Information received from vendors or suppliers was mentioned as a channel by 13% of the users, as was direct mail. These channels do not appear to have a large impact on the user community with regard to a recognizable means of information on new software.

C
Software Company Profiles

The following profiles include several of the leading independent microcomputer software companies. They reflect companies with a strong position in their respective markets or companies with strong product or marketing approaches.

Profiles on other software companies are included in INPUT's U.S Software Products Market report, and in the industry-specific and cross-industry annual reports.

1. ADOBE SYSTEMS INCORPORATED

1585 Charleston Road, P.O.Box 7900
Mountain View, CA 94039

Adobe is a software technology company that designs, develops, and markets systems software used in laser printers, typesetters, displays, and other raster output devices to print integrated text and graphics for electronic printing and publishing applications.

The company's principal product, Adobe's PostScript interpreter, executes page descriptions generated from application programs that support the PostScript page description language to produce documents containing multiple typefaces and graphics. Adobe continues to expand its Type Library with over 200 typefaces, some of which are provided as standard in PostScript-equipped printers, and others which are available separately for downloading.

The PostScript page description language has become a graphics language standard, with OEM customers producing over 30 different printers.

The PostScript interpreter normally resides on a controller board in the laser printer or other raster device.

In 1987, Adobe introduced the Display PostScript system for computer monitors, which extends the PostScript page description language to workstation platforms. This system was recently incorporated into the new computer from NeXT, Inc., and has also been endorsed by DEC and IBM. Display PostScript has the potential for becoming a systems software standard for the development of screen display by independent application software developers and computer systems vendors. A standard would reduce the need for applications developers to write various versions of their software for different computer screen environments.

Adobe markets its PostScript systems software products to computer, printer, and typesetter (OEM) manufacturers.

Also introduced in 1987 was Adobe Illustrator, an application software product that is a computer-assisted illustration tool for producing high-quality art and illustrations.

Adobe Illustrator is marketed to the end user through software distributors.

Since one of Adobe's goals is to promote the PostScript language as an industry standard, Adobe has placed the PostScript language in the public domain.

In November 1987, Adobe announced the signing of contracts with Fujitsu Limited (for PostScript interpreters for Japanese and Western languages), with NEC Corporation of Japan (for Adobe's Kanji PostScript interpreter), and in mid-1988 with Matsushita Corp. of Japan. These contracts with the largest computer suppliers in Japan significantly expand the international market potential for Adobe's PostScript.

In January 1988, the company announced the Adobe Illustrator 88 program. Illustrator 88 brings color and more-sophisticated professional tools for more-advanced applications in technical publications and color textbooks.

In mid-1988, Adobe announced Illustrator 88 for the Macintosh Plus, SE, and II. As an upgrade to the Illustrator product, the company provides an auto-trade feature for automatically turning templates from scanned art or clip art into PostScript art. Illustrator also has a blend command for making graduated colors and an average command for automatically calculating and drawing the stages or transforming one object into another.

In June 1988, Adobe announced that R.R. Donnelley, the largest U.S. printer, had become another licensee of PostScript.

In September 1988, Adobe announced for year-end a Windows version of the Adobe Illustrator PostScript language-based drawing package for the IBM personal computer environment.

In 1988 Adobe Systems also signed OEM agreements to license the Display PostScript system to Digital Equipment Corporation for use under Digital's DEC Windows system and with IBM Corporation.

Adobe will expand its system software technology into related electronic printing markets and will develop new products for selected end-user markets. Particular new product opportunities include color laser printers, Japanese software (with graphic Kanji characters), and facsimile machines.

Other future product offerings should also expand the number of type fonts supported.

2. ASHTON-TATE CORPORATION
20101 Hamilton Avenue
Torrance, CA 90502

Ashton-Tate Corporation—incorporated in 1980 as Software Plus, Inc.—develops, markets, and supports microcomputer software products in six major areas: data base management, word processing, business graphics, integrated decision support, spreadsheets, and desktop publishing. During 1983 the company changed its name to Ashton-Tate and made its first initial public offering of common stock.

Fiscal 1989 revenue reached $307.3 million, a 15% increase over fiscal 1988 revenue of $267.3 million.

The increases in Ashton-Tate's revenues over the past four years have resulted primarily from the additions or introductions of products during those years and the continued increased unit shipments of the company's data base management and other products. During 1988 and the first half of 1989, Ashton-Tate released a DBMS SQL server (LAN) version, DBase IV, word processing and spreadsheet software for the Macintosh, and many other new products.

In January 1988, Ashton-Tate acquired Ann Arbor Softworks, Inc. of Newbury Park, CA in order to expand into the Apple Macintosh word processor and graphics market. Products acquired include FullWrite Professional and FullPaint.

In January 1988, Ashton-Tate announced a strategic alliance with Microsoft to produce and market the Ashton-Tate/Microsoft SQL Server, an advanced OS/2 data base server based on technology developed by Sybase, Inc. Ashton-Tate made an equity investment in Sybase in April 1988.

In February 1988, Ashton-Tate announced dBASE IV, the next generation data base management product. DBASE IV features a redesigned user interface (including applications generator), an automatic program compiler, and dBASE/SQL (a new programming language that unites the dBASE and SQL standards).

In April 1988, Ashton-Tate announced an agreement with Interbase Software Corporation (Tyngsborough, MA) to jointly develop technology components for Ashton-Tate's next generation of workstation data base products running under OS/2 Presentation Manager and other operating systems platforms such as VMS, UNIX, and Macintosh. Ashton-Tate will have exclusive rights to jointly-developed technology, which Ashton-Tate will co-own with Interbase. As part of the agreement, Ashton-Tate has taken an equity position in Interbase.

During 1987, Ashton-Tate acquired the remaining interests in Nippon Ashton-Tate, a joint venture established with Japan Systems Engineering, Inc. to distribute Ashton-Tate products in Japan.

Each of the initial products in Ashton-Tate's product families was originally developed by an independent company from which Ashton-Tate subsequently acquired the product rights. The company's internal development group is primarily in charge of supporting and enhancing existing products and extending product lines, both functionally and to new microcomputers.

Ashton-Tate currently offers microcomputer software products in six major product areas: data base management systems (dBase family and RapidFile), word processing (MultiMate series), business graphics (Master Graphics products, DRAW APPLAUSE, and FullPaint), integrated decision support (Framework series), spreadsheets (Full Impact), and desktop publishing (Byline and FullWrite Professional).

Purchasers of the company's software products receive 90 days' free technical support and therafter must subscribe to one of the company's support programs in order to receive service and support.

Ashton-Tate derives over 50% of its revenues from sales to U.S./Canadian distributors and dealers. The remainder is derived from OEMs, VARs, and international subsidiaries, dealers, distributors, and export sales.

Distributors market Ashton-Tate's products to authorized dealers and provide product support, merchandising aids, and other support services. Ashton-Tate's three non-exclusive distributors in the U.S. are Micro D, Inc., SoftSel Computer Products, and Ingram Software Distribution Services. Ashton-Tate's dealers are primarily microcomputer hardware and software stores. Products are sold through more than 5,000 retail outlets, including national chains such as Businessland, ComputerLand, Egghead Discount Software, Corporate Software, and Entre Computer Centers.

The company targets its OEM sales to microcomputer hardware manufactures and seeks to establish strategic supplier relationships.

Direct sales of certain products, primarily publications and product upgrades, are made to educational institutions and other end users.

Ashton-Tate also had foreign distributors and dealers that service the principal worldwide markets for its products. The company has OEM agreements with several international companies, including IBM in Europe and the Far East.

3. BORLAND INTERNATIONAL, INC.

1800 Green Hills Road
P.O. Box 660001
Scotts Valley, CA 95066-0001

Borland International, Inc., founded in May 1983, markets and supports language development tools and business software for IBM, IBM-compatible and Apple Macintosh microcomputers.

In September 1987, Borland acquired Ansa Software of Belmont, CA. Ansa, formed in 1984, marketed microcomputer software products. Ansa's principal product was Paradox, an IBM-compatible relational data base management system. Ansa now operates as a wholly-owned subsidiary of Borland.

When U.S. Generally Accepted Accounting Principles (US GAAP) are applied to Borland's financials, the acquisition of Ansa is accounted for as a pooling of interests and Borland's consolidated results are restated to include the historical results of Ansa. This restating of financials resulted in an increase in revenue of approximately $5.1 million and $8.9 million for fiscal 1988 and 1987, respectively. Restated revenue for fiscal year 1988 was $81.6 million and $38.1 million for fiscal year 1987.

Management attributes the company's growth to increased sales of its Sprint word processor, the introduction of new products, and the acquisition of Ansa.

In June 1988, Borland acquired the technology of Surpass Software Systems Inc. of Novato, CA, developer of the Surpass integrated spreadsheet product for IBM-compatible microcomputers. The Surpass product development team will be integrated into Borland's Quattro spreadsheet operations. Future versions of Quattro will incorporate the technology from both products. Surpass owners are eligible to purchase Quattro for a special price. When Borland ships a new version of Quattro, Surpass and Quattro owners will be eligible under the same upgrade program.

In July 1986, Borland acquired Singular Software, Inc. of Cupertino, CA, developer of Interlace, a relational data base management product for the Apple Macintosh. The product is currently marketed by Borland as Reflex Plus.

One hundred percent of Borland's fiscal 1988 revenue was derived from its microcomputer software products. Software product offerings include language development tools and business applications.

Borland's first language development tool product, the Borland Turbo Pascal compiler, was introduced in 1983. The company has since expanded its compiler product offerings (the "Turbo Language Series") to include Turbo Pascal, Turbo C, Turbo Assembler & Debugger, Turbo Basic, and Turbo Prolog. The company also provides a range of Turbo Toolbox developer tools to complement the language compiler product line.

Borland's Professional Business Series includes a line of applications for spreadsheet (Quattro: The Professional Spreadsheet), desktop management (Sidekick Plus: The Professional Desktop Manager), word processing (Sprint: The Professional Word Processor), and relational data base management (Paradox OS/2, 2.0, 386, and Network Pack). Borland also provides several productivity tools to supplement other product offerings.

Borland provides support for its products through a staff of technical support specialists and customer service representatives, and through support forums on CompuServe's electronic bulletin board service. Telephone technical support is free to all registered customers. Toll-free hotline support is provided for customer orders. Software is also supported through Borland's international distribution network and published materials.

The Borland Enhanced Support and Training (BEST) Program is offered to Borland's Fortune 100 customers using Professional Business Series products. Members automatically receive a free subscription to the Borland News Service, copies of Borland collateral materials, a free copy of their software supported by BEST, and the option of a special limited liability agreement.

BEST members can participate in the Advanced Support option of BEST for $2,500 to receive all of the complementary services, plus a free library copy of each of their Borland products. The program offers a special hotline providing dedicated customer support from Borland representatives familiar with the customer's application. The program offers remote diagnostics capabilities.

The Professional Business Series is targeted to Fortune 5000 companies and marketed to businesses of all sizes in a range of industries.

The Turbo Language Series is marketed to professional software developers, corporate in-house developers, engineers, programmers, and students.

Borland International (U.K.) Limited, Borland (France) SARL, and Borland International (Europe) ApS are engaged in microcomputer software product development activities. The U.K. and French subsidiaries sell software products in Europe.

Approximately 70% of Borland's fiscal 1988 revenue was derived from the U.S. and 30% from foreign sales, primarily in Europe and Canada.

Borland products have been translated into nine languages and are available in 19 countries.

4. COMPUTER ASSOCIATES INTERNATIONAL, INC.

711 Stewart Avenue
Garden City, NY 11530-4787

Computer Associates International, Inc. (CAI) was incorporated in 1974 and commenced operations in 1976. As a result of ongoing internal development and numerous acquisitions, the company currently markets and supports more than 100 software products worldwide. CAI's product line includes systems software, relational database management systems, and applications software for use on mainframes, minicomputers, and microcomputers.

CAI's fiscal 1988 revenue was $709.1 million, an increase of 57% over 1987 revenue of $452.3 million. Income before taxes increased 79% from $94.8 million in fiscal year 1987 to $170.1 in fiscal year 1988. CAI management attributes the company's revenue growth to the licensing of greater numbers of products, both developed and acquired.

Since 1982, CAI has made 15 acquisitions. Acquisitions affecting the microcomputer software market include the following companies.

L & L Software, Inc. was acquired in May 1987. The primary product line was micro-based cost-accounting software. BPI Systems, Inc.—also acquired in May 1987—was a developer of accounting software for the microcomputer.

Basic Software Group (8/85), Sorcim Corp. (5/84), and Information Unlimited Software, Inc. (7/83) are counted among other microcomputer application developers acquired by Computer Associates.

The Micro Products Division (MPD) markets the company's microcomputer software products in the U.S. and Canada. This division is organized into four regions served by 13 sales offices that market directly to distributors and dealers. MPD has dedicated corporate and direct sales forces that market the company's microcomputer products and support services to large corporate clients, OEMs, government clients, and educational institutions.

Computer Associates' competitors in the microcomputer products arena include Lotus Development, DAC Software, and Peachtree. Approximately 77% of CAI's fiscal 1988 revenue was derived from software product licenses and 23% from maintenance fees. The Micro Products Division accounted for approximately 8% of the total revenue.

CAI has sold more than one million copies of its integrated accounting and productivity microcomputer software products.

In the area of decision support, CAI offers integrated spreadsheet software, project and resource management software, and speadsheet add-in software.

The ACCPAC PLUS family of accounting software provides a wide variety of general-ledger, payables/receivables, payroll, order processing, reporting, word processing, windowing, LAN manager, and development toolkit software.

ACCPAC BPI family provides general accounting, payables/receivable, LAN manager, and inventory management and reporting microcomputer software.

Other general-accounting product groups include ACCPAC Easy for PCs and compatibles and the BPI Entry Series for the Macintosh.

CAI operates approximately 41 offices throughout the U.S., in addition to headquarters in Garden City and over 50 foreign office facilities outside the U.S.

5. LOTUS DEVELOPMENT CORPORATION

55 Cambridge Parkway
Cambridge, MA 02142

Lotus Development Corporation is one of the largest independent developers and marketers of microcomputer software products. The company's principal products include Lotus 1-2-3, Symphony, and Jazz.

In January 1988, Lotus announced Symphony 2.0, the result of an international development effort between offices in Cambridge, MA and Windsor, England. This effort resulted in the production of seven language versions of Symphony. Version 2.0 also includes extensive word processing enhancements, added spreadsheet and data base features, and bundled add-ins.

Also announced in January 1988 was Modern Jazz, an integrated business software package for the Apple Macintosh. Modern Jazz provides the functions of worksheet, graphics, data base, forms, word processing, communications, and a unique Macintosh command language. Features were designed to take advantage of the Macintosh SE and Macintosh II personal computers. Modern Jazz provides a bridge for Lotus spreadsheet applications running between the Macintosh and the IBM or compatible personal computers.

In May 1989, Lotus announced the release of 1-2-3 Release 2.2 and Release 3.

- Release 2.2 is an enhanced version of the Release 2.01 spreadsheet, designed for PC users within the 640K DOS environment. Enhancements include file linking, minimal recalculation of formulas, undo error correction mechanism, search and replace, set or reset width of a range of columns, spreadsheet security, sheet settings, global settings, and command line loading of worksheets. Other features include graphics enhancements, printing enhancements, network support, and other customized features. Release 2.2 supports expanded memory via the Lotus/Intel/Microsoft Expanded Memory Specification. Release 2.2 became available third quarter, 1989.

- Release 3 is an advanced spreadsheet that integrates three-dimensional worksheets, business graphics, and a data base with relational capabilities. Release 3 was designed for users of 80286 and 80386 personal computers and will support both DOS and OS/2 in the same package. It retains the familiar 1-2-3 user interface, is compatible with all releases of 1-2-3, is able to read all 1-2-3 and Symphony files, and can link to all 1-2-3 Release 2.0, 2.01, 2.2 and Symphony 1.1, 1.2, and 2.0 files. Also announced in May 1989 was the network version of Symphony 2.0 for personal computer networks. Symphony 2.0 is available in three editions—Standard, Server, and Node—to remain consistent with Lotus' network standards. All three editions offer identical functionality and complete file compatibility.

- The Server Edition incorporates special software to manage shared program files among the LAN-connected PCs and node PCs it serves.

- The Node Edition provides an additional concurrent use of the Symphony program files on the server.

- The Standard Edition authorizes use by one individual at a time on a machine.

- In a network environment, users of all three editions can share the same spreadsheet files. A software utility regulates the use of a shared file to prevent its being overwritten; only the first person accessing the file may make changes to it.

In April 1987, Lotus and IBM signed a ten-year joint marketing and development agreement for a series of Lotus and IBM products for use on both mainframe and microcomputer systems. The first product will be 1-2-3/M, a mainframe version of Lotus' 1-2-3 spreadsheet product. 1-2-3/M will be marketed by both companies, but sold exclusively by IBM. Lotus and IBM will also explore a range of business applications, including data base applications compatible with the industry standard SQL.

Lotus made several other acquisitions in 1986 that have affected current products and services. These acquisitions include:

- In June 1986, Lotus acquired Graphic Communications, Inc., a developer of business graphics software products for IBM and compatible microcomputers. The company's primary products, Graphwriter and Freelance, take data or graphs generated by 1-2-3 or Symphony and turn them into high-quality images for paper, overhead transparencies, or 35mm slides. GCI operates as a wholly-owned subsidiary of Lotus Development Corporation.

- Lotus acquired iLINK, a universal micro-to-mainframe link software product developed by InfoCenter Software, Inc. during February 1986. The iLINK product has been reworked and reissued by Lotus as The Application Connection.

- Also during February 1986, Lotus acquired GNP Development Corporation. This acquisition gave Lotus the exclusive rights to GNP's existing products and technology, including HAL, a natural (English) language interface for 12-3. GNP operates as a wholly owned subsidiary of Lotus. The majority of Lotus Development Corporation's revenue is derived from retail sales through computer stores and through sales to nonexclusive, independent distributors. The remainder is derived from value-added resellers, microcomputer manufacturers, OEMs, and direct sales to large corporate customers.

6. MICROSOFT CORPORATION

16011 N.E. 36th, Box 97017
Redmond, Washington 98073

Microsoft designs, manufactures, and markets microcomputer systems and applications software and microcomputer peripherals. Approximately 87% of Microsoft's 1988 revenue was derived from software products (47% systems software and 40% application software). The remaining 13% of revenue was derived from hardware, books, and other sales.

The company's largest selling software product to date is MS-DOS, introduced in 1981. Its business application software products provide word processing, spreadsheet, file management, graphics, communications, and project management capabilities for both MS-DOS and Macintosh environments. Other applications are provided on CD-ROM disk. Microsoft is a leading provider of Macintosh application software.

Microsoft markets software and hardware products through four primary channels of distribution: domestic retail, domestic OEM, international OEMs, and international retail.

Major announcements and product introductions made during 1987 and 1988 include:

- Microsoft Operating System/2 (Microsoft OS/2)
- Microsoft OS/2 LAN Manager, an advanced local-area network operating environment
- XENIX System V/386, an 80386-based version of XENIX (Microsoft's implementation of UNIX System V)
- Microsoft Works, an integrated software product for the Macintosh that contains a spreadsheet, data base program, word processor, and communications tool
- Microsoft QuickC compiler for IBM and compatible microcomputer
- Microsoft PowerPoint, the desktop presentation program for Macintosh computers
- Windows/386 and Windows/286, Windows inteface based on the Intel 80386 and 80286 microprocessor chips
- Microsoft Bookshelf, a library of 10 reference tools on a single CD-ROM disk
- An alliance with Hewlett-Packard and Aldus Corporation to promote the Microsft-based solution (graphics users interface) for the desktop publishing market for equipment running the MS-DOS operating system
- An agreement with American Airlines to provide its integrated office automation software product, MicrosoftWorks, in the SABRE Travel Information Network
- The SQL Server, a relational data base server software product for local-area networks is being jointly developed by Microsoft, Ashton-Tate, and Sybase, Inc. SQL Server runs on top of OS/2-based networks, including MS OS/2 LAN Manager and IBM OS/2 LAN Server. The SQL Server is designed to facilitate the development of multiuser applications for workgroup computing problems. SQL Server can run on a network server machine with either the MS OS/2 LAN Manager or the IBM OS/2 LAN Server.

Microsoft offers technical support for all of its products through its Product Support Group. The group handles approximately 10,000 questions per month through telephone and letter requests as well as providing assistance to developers through modem communications systems in a service called Microsoft Online.

Microsoft has OEM agreements with virtually all of the major domestic microcomputer manufacturers, including AT&T, COMPAQ, DEC, Hewlett-Packard, IBM, Olivetti, Tandy, Wang, and Zenith.

Microsoft markets products in the domestic retail channel through independent distributors and dealers; value-added dealers such as Businessland, and the Computer Factory; and large volume dealers who emphasize large corporate customers. Independent nonexclusive distributors include Microamerica, Ingram Computer, Micro D, and Softsel Computer Products.

The Large Volume Account Reseller Program permits dealers that commit to target large customers to obtain products directly from Microsoft and gives incentives in return for commitments to train and support these customers. Egghead Discount Software is Microsoft's largest Large Volume Dealer.

Microsoft has established a National Accounts Group to work with large volume dealers to market application products directly to large corporate customers.

7. THE SANTA CRUZ OPERATION, INC.

400 Encinal Street
Santa Cruz, CA 95060

The Santa Cruz Operation (SCO), Inc. is the leading supplier of the XENIX operating system. SCO XENIX System V is an enhanced version of AT&T's UNIX operating system designed specifically for standard microcomputers. SCO is also a major supplier of application and systems software based on the XENIX operating system. SCO's software supports the following functions: word processing, integrated spreadsheets, presentation graphics, statistical analysis, data base management, project management packages, and office automation—as well as packages to link DOS and XENIX applications, and micro-to-mainframe communications packages.

SCO was founded as a technical management consulting service specializing in applications developed under UNIX. In 1981, SCO began working with Microsoft Corporation to develop and market XENIX, the first commercial version of the UNIX operating system.

In 1983, SCO introduced the first XENIX operating system and XENIX-based applications for 8088- and 8086-based microcomputers. SCO followed by introducing XENIX operating systems for 80386-based microcomputers in 1987.

In 1988, SCO released SCO XENIX System V Release 2.3 for 80386-based microcomputers running applications written for both UNIX

System V and XENIX System V operating systems. SCO continues to enhance its operating systems and add to its application software product portfolio designed to run on SCO's proprietary operating systems.

SCO's strategic directions include taking advantage of industry-standard hardware in the workstation environment, developing applications for the X11 environment, utilizing distributed data base technology across heterogenous networks, and establishing standards in user interface technology.

In February 1989, Microsoft Corporation further strengthened the relationship with SCO by purchasing a minority share of SCO. As part of the agreement, both companies will increase resources committed to joint technology exchange, product development, and marketing efforts.

Total fiscal 1988 revenue reached $60 million, a 122% increase over fiscal 1987 revenue of $27 million.

The corporate headquarters in Santa Cruz, CA handles the research and development of SCO's products, and the sales and marketing functions to the commercial market in the U.S., Canada, and Asia Pacific. Training services offered by the company are handled by this office.

The Santa Cruz Operation, Ltd., in Watford (U.K.), is the European headquarters for SCO. SCO has subsidiaries in France and Germany, and has plans to open a subsidiary in Italy.

SCO provides the XENIX operating system, application software, training, and systems customization for XENIX systems.

SCO XENIX System V will run on over 90% of the microcomputers that run microcomputer UNIX and has a larger applications base than microcomputer UNIX. XENIX provides a multitasking, multiuser environment. Applications written for earlier versions of SCO XENIX System V are compatible with any other version of SCO XENIX System V, and applications written for AT&T UNIX System V/386 Release 3.1 will run on SCO XENIX 386 System V without recompiling.

SCO has recently introduced the Open Desktop, which is based on the SCO UNIX System V/386 operating system. Commercial shipments are expected to begin late 1989. Using Merge 386, Open Desktop transparently integrates DOS and UNIX systems. Users can run applications based on either operating system or develop applications that use the system facilities of both operating systems. The graphical interface is based on the Open Software Foundation standard, OSF/Motif. It includes the OSF/Motif toolkit, presentation description language, window manager, and style guide.

SCO Xsight, developed by SCO and Locus Computing Corporation, provides the windowing system for Open Desktop. SCO Xsight is based on the X Window System Version 11 developed at MIT (X11), and is compatible with X11 workstations from any vendor, or DOS microcomputers running PC Xsight from Locus Computing Corporation.

Open Desktop uses INGRES/386 from Relational Technology Inc. and SCO ISAM for information management. INGRES/386 is an SQL relational data base management system providing transparent access to data stored in either a network of PCs or in the corporate data center. SCO ISAM provides a library of C-language functions for creating and manipulating indexed file systems. Open Desktop includes interface specifications and libraries to other major networked relational data base systems such as ORACLE.

Using Ethernet connections to remote machines, Open Desktop offers seamless data and resource sharing using SCO TCP/IP and SCO NFS. LAN Manager compatibility enables Open Desktop applications to communicate with OS/2, DOS, and UNIX System servers that support LAN Manager protocols.

Many of the application products marketed by SCO were developed by other companies and ported, under agreement, to SCO's operating system and subsequently supplied by SCO to customers.

SCO offers training for XENIX and XENIX-based applications at SCO's headquarters or the client's site.

SCO's products are marketed across industry segments to large and small companies. Products are sold through a network of distributors, VARs, retailers, and OEMs. SCO also sells its products directly to systems integrators.

8. SOFTWARE PUBLISHING CORPORATION

1901 Landings Drive
Mountain View, CA 94303
(415) 962-8910

Software Publishing Corporation (SPC), founded in 1980, develops and markets microcomputer-based application software packages designed to increase the productivity of business professionals. The company's current product lines include PFS®, for both entry-level and experienced computer users; OfficeWriter®, for the more experienced word processor user; and Harvard™, for specialized applications. SPC has sold over four million copies of its software products worldwide.

In September 1988, SPC acquired Office Solutions, Inc. (OSI), marketer of OfficeWriter, a high-end word processor for microcomputers.

SPC acquired Harvard Software, Inc. in August 1985. Two of SPC's current products (Harvard Project Manager™ and Harvard Graphics™) are enhancements of products acquired with Harvard Software.

SPC's customers traditionally have been small- to medium-sized businesses. Beginning in 1986, sales to large corporations, the company's primary target market, increased significantly. SPC's plan for fiscal 1989 is to continue to target products to corporate end users, develop new products for the OS/2 environment, and continue to increase the power of its products operating under the MS-DOS operating environment. SPC will continue the expansion of its international marketing activities.

Fiscal 1988 revenue reached $73 million, a 90% increase over fiscal 1987 revenue of $39 million. Net income rose 160%, from $5.2 million in fiscal 1987 to $13.5 million in fiscal 1988.

SPC management attributes fiscal 1988 results to increased unit shipments and cost of sales. SPC had increased unit shipments of all product offerings as a result of the expansion of the direct sales force, the release of new products, and the increasing penetration of major corporate accounts. Also contributing was the increase in international sales.

Cost of sales declined as a percent of total revenue in fiscal 1988, primarily because of increased sales of higher-priced products that have higher gross margins.

Major competitors include Lotus Development Corporation, Ashton-Tate, and Microsoft Corporation, as well as various microcomputer manufacturers.

One hundred percent of SPC's fiscal 1988 revenue was derived from the sale of microcomputer application software products to independent distributors, retail outlets, and OEMs.

SPC currently markets four categories of products targeted to first-time users, professional users, and business professionals.

PFS:First products are targeted to novice microcomputer users. These products include PFS:First Choice 2.0®, PFS:First Publisher™, and PFS:First Graphics™. These software packages provide word processing, desktop publishing techniques, file management, spreadsheet analysis, electronic communications, and graphics features.

Professional products are targeted to business professionals who are experienced microcomputer users. These products include PFS:Professional File™, PFS:Professional Write™, PFS:Professional Plan™, and PFS: Professional LAN Pack™. The OfficeWriter word processor is targeted for the more experienced, everyday user. Features of the software include file management, word processing, and spreadsheet analysis. The PFS:Professional LAN Pack allows five named users to share PFS:Professional Series files on a local-area network. The pack supports the IBM PC-Net, 3Com 3+, and Novell Advanced Netware/86 networks.

Harvard products, which address specialized applications, include Harvard Project Manager, Harvard Graphics, Harvard Graphics Accessories™, and Harvard Graphics LAN Pack™. Features of the software include project management tools, presentation graphics, and graphics accessories. The Harvard Graphics LAN Pack allows five named users to share Harvard Graphics files on a local-area network. It supports the IBM PC-Net, 3Com 3+, and Novell Advanced Netware/86 networks.

During fiscal 1983 and 1984, SPC entered into license agreements with IBM under which IBM is licensed to produce and sell IBM proprietary versions of SPC's first generation of PFS products.

SPC sells its PFS and Harvard product lines through distributors, retailers, and OEMs.

The company's primary channel of distribution worldwide is through software distributors and retailers to corporate and small business end users. Principal distributors include Ingram Software, Inc., Softsel Computer Products, Inc., and Micro D Inc. Principal retailer for SPC's products is Egghead Discount Software.

International sales are made exclusively through independent distributors.

SPC has also entered into joint marketing and selling relationships with microcomputer and peripheral manufacturers. In fiscal 1988 SPC's primary OEM customers, excluding IBM, were Tandy Corporation and Epson America, Inc.

SPC's sales force also calls directly on corporate customers.

Approximately 87% of SPC's fiscal 1988 revenue was derived from the U.S. The remaining 13% of revenue was derived from export sales.

The company's products are represented by distributors in 19 countries and are sold worldwide.

9. SYBASE

6475 Christie Avenue
Emeryville, CA 94608

Sybase is the developer and marketer of the SYBASE relational data base management system designed explicitly for on-line applications.

Sybase was founded by a group of industry experts to address the shortcomings of real-time product offerings in the area of data base management for on-line transaction processing. Since its founding, Sybase has secured venture capital funding from other software companies and venture capitalists.

Sybase revenue for 1988 reached approximately $24 million, a 300% increase over 1987 revenue of $6 million. This increase in revenue is due solely to increased sales volume.

Sybase has OEM agreements with Pyramid Technology Corporation, Stratus Computer, Inc., and NeXT, Inc. Sybase also has development agreements with Microsoft Corporation, Ashton-Tate, and TRW, Inc.

Sybase has established a strategic software partners program to provide customers with additional tools that can access SYBASE data. Current software partners include: Natural Language Incorporated, Network Innovations Corporation, DB/ACCESS Inc., Ashton-Tate, Borland International, Fortex, Inside Automation, National Information Systems, Unify, IBM, Gold Hill Computers, Neuron Data, DEFT, IDE, 20/20, SPSS, Verity, V.I. Corporation, and Information Builders, Inc.

Sybase designs, manufactures, and markets relational DBMS systems. The SYBASE system is composed of the SYBASE SQL Server and the SYBASE SQL Toolset. The SYBASE SQL Server handles SQL query processing, transaction management, and the rules for a legal update. The SYBASE SQL Server is geared toward on-line transaction processing, as evidenced by the functional attributes of high-volume processing and data integrity.

High-volume processing is supported by the system using precompiled procedures. By reducing the amount of memory needed per system user and for the operating system, more memory can be reserved for data caching and I/Os can be reduced.

Data integrity is maintained by defining integrity rules and storing them in the data base rather than in the applications. No application can bypass the integrity rules, and integrity can be assured. The system also supports referential integrity, in that an update will cause an update or deletion in related records.

High system availability is maintained by allowing system maintenance functions to be performed without taking the system off-line.

Distributed data management is supported over a network of heterogeneous computers with multiple data bases while maintaining data integrity.

The SYBASE SQL Toolset is essentially a window-based user interface. The toolset has the components of APT-Workbench, DB-LIBRARY, and Data Workbench for application development.

- The APT-Workbench is a complete 4GL application development environment consisting of an application generator, a screen painter, a 4GL, open interfaces to 3GLs, and a deployment module.
- DB-LIBRARY is a programming language interface that allows custom programs and non-SYBASE products to communicate with the SYBASE SQL Server.
- Data Workbench is a set of visually based tools for application development, data base maintenance, and decision support.

In March 1989, Sybase announced the Secure SQL Server, a multilevel secure relational data base management system. The system is designed to meet the National Computer Security Center's B1- and B2-level security for multilevel data. Both the B1 and B2 versions will provide mandatory and discretionary access control, auditing of security-relevant events, and separate user and administrator roles.

Sybase targets its marketing efforts to Fortune 100 companies as well as government and defense agencies. Although the SYBASE products are used by all industries, the principal industries served are government and defense, banking and finance, telecommunications, and manufacturing.

Sybase markets products directly from its 16 North American sales offices and five international offices. Approximately 80% of revenue was generated through the direct sales force; 20% came from foreign distributorships, VARs, and hardware OEMs.

10. WORDPERFECT CORPORATION

1555 N. Technology Way
Orem, Utah 84057

WordPerfect Corporation was founded in 1979 as Satellite Software International; the company specializes in word processing and office automation software products. The company name was changed in April 1986 to better identify with its well-known word processing package, WordPerfect.

The company provides fully integratable packages based on its basic WordPerfect word processing software.

Total 1988 revenue reached approximately $178.0, a 77% increase over 1987 revenue of $100.3 million.

WordPerfect Corporation management attributes 1988 revenue growth to increases in sales volume.

In early 1988, WordPerfect Corporation announced several marketing and teaming agreements that affect WordPerfect products.

WordPerfect Corporation and Hewlett-Packard will co-market WordPerfect 5.0 and the HP Laser-Jet printer through direct mailings to the customers of both companies, consolidated promotional literature for computer distributors and dealers, and demonstrations of the products working together.

WordPerfect Corporation, in conjunction with Marketing Graphics, Inc. (MGI), will ship the MGI WordPerfect graphic sampler with each WordPerfect 5.0 package. The complete MGI Publisher's PicturePak for WordPerfect library is available from MGI.

As a result of a co-marketing agreement with Bitstream, Inc., WordPerfect 5.0 users will be offered the Bitstream Fontware Installation Kit for WordPerfect and nine Bitstream fonts at no charge. The Installation Kit will run under PC/DOS or MS/DOS and requires an IBM PC/AT or compatible.

The WordPerfect PC Division provides a set of office productivity tools for the IBM and compatible microcomputers, including WordPerfect, WordPerfect Office, PlanPerfect, DataPerfect, and WordPerfect Library.

The WordPerfect Apple Division offers products that provide many of the features of the IBM and compatible version of WordPerfect within the constraint of the Apple IIe, IIc, IIgs, and Macintosh.

The Data General Division markets the original version of WordPerfect which was developed before the microcomputer market expansion. This division offers products that support office environments where microcomputers and minicomputers coexist. Such products include WordPerfect, WordPerfect Library, and WordPerfect Office, as well as specifics to this sector such as P-Edit for program editing.

The VAX Division provides versions of WordPerfect and WordPerfect Office for the DEC VAX that are similar to the versions for the microcomputers and the Data General systems. Users may easily move from working with the software on the microcomputer to other minicomputer versions without a long readjustment curve to the new platform. Future products will include WordPerfect Library, PlanPerfect, and P-Edit.

The International Division supports the company's intent to provide software in as many languages as possible to support multinational companies. Foreign versions of the software contain the same set of features as the English version.

The WordPerfect family of integratable software includes word processing, spreadsheet, and data base management capabilities as well as utilities to share data.

WordPerfect word processing software includes many popular features as well as integrated text, graphics, styles, and mixed fonts. WordPerfect 5.0 for IBM and compatibles can be installed as a network. WordPerfect is available in 14 languages and a Personal version for personal word processing.

PlanPerfect is the enhanced version of the original MathPlan spreadsheet program. PlanPerfect offers tools for creating, editing, and manipulation formulas throughout the spreadsheet. Graphs use regular text characters and may be transferred into WordPerfect documents. PlanPerfect can be installed on a network.

DataPerfect is the enhanced version of the original SSIDATA, a menu-driven data base program for storing, organizing, and reviewing information. Software is supported on the 3COM 3+, 3Com Ethernet Series, AST-PCnet, AT&T Starlan, FOX 10Net, IBM PC Network, and others.

WordPerfect Library is a collection of programs designed to integrate other WordPerfect Corporation programs and facilitate the sharing of data and switching of programs.

WordPerfect provides toll-free hotline support for its customers and responds to over 10,000 support requests per day.

WordPerfect sells to large end-user corporations and educational institutions, and through distributors and dealers, original equipment manufacturers (OEMs), and computer retail chains. WordPerfect Corporation has marketing representatives and distributors in 22 countries.

VI

Recommendations

VI

Recommendations

There are several opportunities for vendors to increase market share or revenue in the personal computer software arena. These opportunities focus on product and marketing issues, as shown in Exhibit VI-1.

EXHIBIT VI-1

Software Opportunities

Product Issues

- Approach to "standards"
- Integrated software
- Graphical interface use

Marketing Issues

- Joint ventures
- Support services

Opportunities in the product area begin with the question of how vendors develop a plan for standards and how the evolving standards will relate to development and marketing efforts.

- Vendors tdeveloping products operating under one or more of the proposed standards are covering all the bases now and not waiting for any true standard to emerge. This state of confusion may exist for a few more years; in the meantime users are still looking for solutions that address their problems today and remain flexible enough to be integrated into a system incorporating the connectivity of standards when they do emerge.

- Each of the proposed standards for operating systems has merits and limitations. Analysis of the application and proposed environment is central to the choice of the operating system. Flexibility should be built into the application to allow for connections to other systems in the future.

Users are most concerned about integrated applications and about turning computing efforts into a total information processing environment. Vendors integrating related or complementary software applications will be able to market more of a total solution to users. Joint development efforts on the part of software vendors will also result in more-integrated and complementary applications.

Another issue of concern in the user community is the incorporation of graphical interface software into applications. With the complexity of the user environment and the lack of user sophistication, the use of a graphical interface will simplify the user's environment.

Strategic recommendations for marketing include the enhancement of user support services and joint marketing agreements.

Joint marketing agreements will capitalize on client contacts as well as on marketing a total-systems approach to users. Vendors with complementary products will be able to use joint sales calls to maximize prospects of both companies. By putting together components of a system into one package for users or enhancing the system with related items, users are more likely to use the system to full potential.

The level of computing sophistication of the users and the increasing complexity of the computing environment are major reasons why users will need more support services from software vendors in the future. As more areas become part of integrated work group computing, users are going to need support services to troubleshoot network and application difficulties. Some vendors have responded by assigning dedicated support personnel to large customers with complex systems.

VII

Conclusions

VII

Conclusions

The personal computer software market has become complicated with the emergence of networks, work groups, and distributed and cooperative processing. Users are looking to software product vendors for assistance in creating a cost-effective, efficient information environment. This environment should be totally integrated with the latest technology and be flexible enough to grow to meet the user's future requirements.

Emerging technology will enhance and complicate the microcomputer software market as new chip technology expands the capabilities of the micro. These new capabilities will make the microcomputer more efficient for many applications that have traditionally been run on mainframes. Bringing the processing to the microcomputer level will mean more distributed sharing of processing and information as well as cooperative processing. These processing environments each bring their own sets of specific positive aspects and potential problems that need to be handled by the users and, indirectly, the vendors.

Standards, or lack of them, the users and vendors in a state of confusion. By analyzing the application area, the environment, and the capabilities of the different options, vendors may be able to supply the software that users require and still minimize the risk of developing applications that may not meet the "standard" in the future. In the absence of standards, vendors need to take calculated risks to retain their presence in the market.

A

Appendix: INPUT Definitions

A

Appendix: INPUT Definitions

Information Services —Computer-related services involving one or more of the following:

- Processing of computer-based applications using vendor computers (called "processing services").
- Services that assist users in performing functions on their own computers or vendor computers (called "software products" and/or "professional services").
- Services that utilize a combination of hardware and software, integrated into a total system (called "turnkey systems").

A

User Expenditures

All user expenditures reported are "available" (i.e., noncaptive, as defined below).

Noncaptive Information Services User Expenditures—Expenditures paid for information services provided by a vendor that is not part of the same parent corporation as the user.

Captive Information Services User Expenditures—Expenditures received from users who are part of the same parent corporation as the vendor.

B

Delivery Modes

Processing Services —This category includes remote computing services, batch services, processing facilities management, on-line data bases, and value-added networks.

- *Remote Computing Services (RCS)* —Provision of data processing to a user by means of terminals at the user's site(s). Terminals are connected by a data communications network to the vendor's central computer. RCS includes four submodes.

- *Interactive* —Characterized by the interaction of the user with the system, primarily for problem-solving timesharing, but also for data entry and transaction processing; the user is on-line to the program/files. Computer response is usually measured in seconds or fractions of a second.

- *Remote Batch* —Where the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resource requirements. Computer response is measured in minutes or hours.

- *Proprietary Data Base* —Characterized by the retrieval and processing of information from a vendor-maintained data base. The data base may be owned by the vendor or by a third party.

- *User Site Hardware Services (USHS)* —Those offerings provided by RCS vendors that place programmable hardware at the user's site rather than at the vendor's data center. Some vendors in the federal government market provide this service under the label of distributed data services. USHS offers:

  - ° Access to a communications network.

  - ° Access through the network to the RCS vendor's larger computers.

  - ° Local management and storage of a data base subset that will service local terminal users via the connection of a data base processor to the network.

  - ° Significant software as part of the service.

- *Batch Services* —These include data processing at vendors' sites for user programs and/or data that are physically transported (as opposed to transported electronically by telecommunications media) to and/or from those sites. Data entry and data output services, such as keypunching and computer output microfilm processing, are also included. Batch services include expenditures by users who take their data to a vendor site that has a terminal connected to a remote computer for the actual processing.

- *Processing Facilities Management (PFM)* —Also referred to as "Resource Management," "Systems Management," or "COCO" (contractor-owned, contractor-operated). PFM is the management of all or part of a user's data processing functions under a long-term contract of not less than one year. This would include remote computing and batch services. To qualify as PFM, the contractor must directly plan, control, operate, and own the facility provided to the user–either onsite, through communications lines, or in a mixed mode.

- *Value-Added Networks (VANs)* —VANs typically involve common carrier network transmission facilities that are augmented with computerized switching. These networks have become associated with packet-switching technology because the public VANs that have received the most attention (e.g., Telenet and TYMNET) employ packet-switching techniques. However, other added data service features such as store-and-forward message switching, terminal interfacing, error detection and correction, and host computer interfacing are of equal importance.

Processing services are further differentiated as follows:

- *Cross-industry* services involve the processing of applications that are targeted to specific user departments (e.g., finance, personnel, sales) but that cut across industry lines. Most general-ledger, accounts receivable, payroll, and personnel applications fall into this category. Cross-industry data base services, for which the vendor supplies the data base and controls access to it (although it may be owned by a third party), are included in this category. General-purpose tools such as financial planning systems, linear regression packages, and other statistical routines are also included. However, when the application, tool, or data base is designed for specific industry use, then the service is industry-specific (see below).

- *Industry-specific* services provide processing for particular functions or problems unique to an industry or industry group. Specialty applications can be either business or scientific in orientation. Industry-specific data base services, for which the vendor supplies the data base and controls access to it (although it may be owned by a third party), are also included under this category. Examples of industry-specialty applications are seismic data processing, numerically controlled machine tool software development, and demand deposit accounting.

- *Utility* services are those for which the vendor provides access to a computer and/or communications network with basic software that enables users to develop and/or process their own systems. These basic tools often include terminal-handling software, sorts, language compilers, data base management systems, information retrieval software, scientific library routines, and other systems software.

Software Products —This category includes user purchases of applications and systems software packages for in-house computer systems.

Included are lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement and maintain the package at the user's sites. Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself. There are several subcategories of software products, as indicated below.

- *Applications Products* —Software that performs processing that services user functions directly related to solving a business or organizational need. The products can be:
  - *Cross-Industry Products* —Used in multiple-industry applications as well as the federal government sector. Examples are payroll, inventory control, and financial planning.
  - *Industry-Specific Products* —Used in a specific industry sector, such as banking and finance, transportation, or discrete manufacturing. Examples are demand deposit accounting, airline scheduling, and material resource planning.
- *Systems Software Products* —Software that enables the computer/ communications system to perform basic functions. These products include:
  - *System Control Products* —Function during applications program execution to manage the computer system resources. Examples include operating systems, communication monitors, emulators, and spoolers.
  - *Data Center Management Products* —Used by operations personnel to manage computer system resources and personnel more effectively. Examples include performance measurement, job accounting, computer operations scheduling, and utilities.
  - *Applications Development Products* —Used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include languages, sorts, productivity aids, compilers, data dictionaries, data base management systems, report writers, project control systems, and retrieval systems.

Professional Services—This category includes consulting, education and training, programming and analysis, and some facilities management as defined below.

- *Software Development* —This service develops a software system on a custom basis. It includes one or more of the following: user requirements, system design, contract, and programming.

- *Education and Training* —Products and/or services related to information systems and services for the user, including computer-aided instruction (CAI), computer-based education (CBE), and vendor instruction of user personnel in operations, programming, and maintenance.

- *Consulting Services* —Information systems and/or services management consulting, program assistance (technical and/or management), feasibility analyses, and cost-effectiveness trade-off studies.

- *Systems Operations (Formerly "Facilities Management")* —This is a counterpart to processing facilities management, except the computing equipment is owned or leased by the client, not by the vendor. The vendor provides the staff to operate, maintain, and manage the client's facility.

Turnkey Systems (also known as integrated systems)—A turnkey system is an integration of systems and applications software with CPU hardware and peripherals, packaged as a single applications solution. The value added by the vendor is primarily in the software and support. Most CAD/CAM systems and many small-business systems are turnkey systems. This does not include specialized hardware systems such as word processors, cash registers, or process control systems, nor does it include Embedded Computer Resources for military applications. Turnkey systems are available either as custom or packaged systems.

- Hardware vendors that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors.

- Turnkey systems revenue is divided into two categories.

    - *Industry-Specific Systems* —that is, systems that serve a specific function for a given industry sector such as automobile dealer parts inventory, CAD/CAM systems, or discrete manufacturing control systems.

    - *Cross-Industry Systems* —that is, systems that provide a specific function that is applicable to a wide range of industry sectors such as financial planning systems, payroll systems, or personnel management systems.

- Revenue includes hardware, software, and support functions.

Systems Integration —Services associated with systems design, integration of computing components, installation, and acceptance of computer/ communication systems. Systems integration can include one or more of the major information services delivery modes—professional services, turnkey systems, and software products. System components may be furnished by separate vendors (not as an integrated system by one vendor, called the prime contractor); services may be furnished by a vendor or by a not-for-profit organization. Integration services also may be provided with related engineering activities, such as SE&I (Systems Engineering and Integration) or SETA (Systems Engineering and Technical Assistance).

C

Hardware/Hardware Systems

Hardware —Includes all computer and telecommunications equipment that can be separately acquired with or without installation by the vendor and not acquired as part of an integrated system.

- *Peripherals* —Includes all input, output, communications, and storage devices other than main memory that can be connected locally to the main processor and generally cannot be included in other categories such as terminals.

- *Input Devices* —Includes keyboards, numeric pads, card readers, light pens and track balls, tape readers, position and motion sensors, and analog-to-digital converters.

- *Output Devices* —Includes printers, CRTs, projection television screens, micrographics processors, digital graphics, and plotters.

- *Communication Devices* —Includes modems, encryption equipment, special interfaces, and error control.

- *Storage Devices* —Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, solid state (integrated circuits), and bubble and optical memories.

Terminals—There are three types of terminals as described below:

- *User-Programmable* —Also called intelligent terminals, including:

  - Single-station or standalone
  - Multistation shared processor
  - Teleprinter
  - Remote batch

- *User Nonprogrammable*

    - Single-station
    - Multistation shared processor
    - Teleprinter

- *Limited Function* —Originally developed for specific needs, such as point-of-sale (POS), inventory data collection, controlled access, and other applications.

Hardware Systems —Includes all processors from microcomputers to supercomputers. Hardware systems may require type- or model-unique operating software to be functional, but this category excludes applications software and peripheral devices, other than main memory and processors or CPUs not provided as part of an integrated (turnkey) system.

- *Microcomputer* —Combines all of the CPU, memory, and peripheral functions of an 8- or 16-bit computer on a chip in the form of:

    - Integrated circuit package
    - Plug-in board with more memory and peripheral circuits
    - Console including keyboard and interfacing connectors
    - Personal computer with at least one external storage device directly addressable by the CPU

- *Minicomputer* —Usually a 12-, 16- or 32-bit computer that may be provided with limited applications software and support and may represent a portion of a complete large system.

    - Personal business computer
    - Small laboratory computer
    - Nodal computer in a distributed data network, remote data collection network, or connected network, or connected to remote microcomputers

- *Mainframe*—Typically a 32- or 64-bit computer with extensive applications software and a number of peripherals in standalone or multiple-CPU configurations for business (administrative, personnel, and logistics) applications; also called a general-purpose computer.

    - *Large Computer* —Presently centered around storage controllers but likely to become bus-oriented and to consist of multiple processors or parallel processors. Intended for structured mathematical and signal processing and typically used with general-purpose, von-Neumann-type processors for system control.

- *Supercomputer* —High-powered processors with numerical processing throughout that is significantly greater than the fastest general-purpose computers, with capacities in the vicinity of 10-50 million floating point operations per second (MFLOPS). Supercomputers fit in one of two categories:

- *Real Time* —Generally used for signal processing in military applications.

- *Non-Real Time* —For scientific use in one of three configurations:

  - Parallel processors
  - Pipeline processor
  - Vector processor

- *Newer Supercomputers* —with burst modes approaching 300 MFLOPS, main storage size up to 10 million words, and on-line storage in the one- to three-gigabyte class are also becoming more common.

- *Embedded Computer* —Dedicated computer system designed and implemented as an integral part of a weapon, weapon system, or platform; critical to a military or intelligence mission such as command and control, cryptological activities, or intelligence activities. Characterized by military specifications (MIL SPEC) appearance and operation, limited but reprogrammable applications software, and permanent or semipermanent interfaces. May vary in capacity from microcomputers to parallel processor computer systems.

D

Telecommunications

Networks —Electronic interconnection between sites or locations that may incorporate links between central computer sites and remote locations and switching and/or regional data processing nodes. Network services typically are provided on a leased basis by a vendor to move data, voice, video, or textual information between locations. Networks can be categorized in several different ways.

- *Common Carrier Network* —A public access network, such as provided by AT&T, consisting of conventional voice-grade circuits and regular switching facilities accessed through dial-up calling with leased or user-owned modems for transfer rates between 150 and 1200 baud.

- *Value-Added Network (VAN)* —(See listing under Section B, Delivery Modes.)

- *Local Area Network (LAN)* —Limited-access network between computing resources in a relatively small (but not necessarily contiguous) area, such as a building, complex of buildings, or buildings distributed within a metropolitan area. Uses one of two signaling methods.

- *Baseband*—Signaling using digital waveforms on a single frequency band, usually at voice frequencies and bandwidth, and limited to a single sender at any given moment. When used for local-area networks, typically implemented with TDM to permit multiple access.

- *Broadband*—Transmission facilities that use frequencies greater than normal voice-grade, supported in local-area networks with RF modems and AC signaling. Also known as wideband. Employs multiplexing techniques that increase carrier frequency between terminals to provide:

  - Multiple (simultaneous) channels via FDM (Frequency Division Multiplexing).

  - Multiple (time-sequenced) channels via TDM (Time Division Multiplexing).

  - High-speed data transfer rate via parallel mode at rates of up to 96,000 baud (or higher, depending on media).

Transmission Facilities— Includes wire, carrier, coaxial cable, microwave, optical fiber, satellites, cellular radio, and marine cable operating in one of two modes depending on the vendor and the distribution of the network.

- *Mode*—May be either:

  - *Analog*—Transmission or signal with continuous-waveform representation, typified by AT&T's predominantly voice-grade DDD network and most telephone operating company distribution systems.

  - *Digital*—Transmission or signal using discontinuous, discrete quantities to represent data, which may be voice, data, record, video, or text, in binary form.

- *Media*—May be any of the following:

  - *Wire*—Varies from earlier single-line teletype networks, to two-wire standard telephone (twisted pair), to four-wire full-duplex balanced lines.

  - *Carrier*—A wave, pulse train, or other signal suitable for modulation by an information-bearing signal to be transmitted over a communications system, used in multiplexing applications to increase network capacity.

- *Coaxial Cable* —A cable used in HF (high-frequency) and VHF (very high frequency), single-frequency, or carrier-based systems; requires frequent reamplification (repeaters) to carry the signal any distance.

- *Microwave* —UHF (ultra-high-frequency) multichannel, point-to-point, repeated radio transmission, also capable of wide frequency channels.

- *Optical Fiber* —Local signal distribution systems employed in limited areas, using light-transmitting glass fibers and TDM for multichannel applications.

- *Communications Satellites*—Synchronous earth-orbiting systems that provide point-to-point, two-way service over significant distances without intermediate amplification (repeaters), but requiring suitable groundstation facilities for up- and down-link operation.

- *Cellular Radio* —Network of fixed, low-powered two-way radios that are linked by a computer system to track mobile phone/data set units. Each radio serves a small area called a cell. The computer switches service connections to the mobile unit from cell to cell.

E

Other Considerations

When questions arise about the proper place to count certain user expenditures, INPUT addresses them from the user viewpoint. Expenditures are then categorized according to what users perceive they are buying.

The standard industrial classification (SIC) codes are used to define the economic activity contained in generic sectors such as process manufacturing, insurance, or transportation.

The specific industries (and their SIC codes) included under these generic industry sectors are detailed in the exhibit.

EXHIBIT A-1

INDUSTRY SECTOR DEFINITIONS

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Discrete Manufacturing	23	Apparel
	25	Furniture
	27	Printing
	31	Leather
	34	Metal
	35	Machinery
	36	Electronics
	37	Transportation
	38	Scientific and Control Instruments
	39	Miscellaneous
Process Manufacturing	10	Metal Mining
	11	Anthracite Mining
	12	Coal Mining
	13	Oil and Gas Extraction
	14	Mining/Quarrying of Non-Metallic Minerals, except Fuels
	20	Food Products
	21	Tobacco
	22	Textile Products
	24	Lumber and Wood Products
	26	Paper Products
	28	Chemicals
	29	Petroleum
	30	Rubber and Plastics
	32	Stone, Glass, Clay
	33	Primary Metals
Transportation	40	Railroads
	41	Local Transit
	42	Motor Freight
	43	U.S. Postal Service
	44	Water Transportation
	45	Air
	46	Pipelines
	47	Transportation Services

EXHIBIT A-1a

INDUSTRY SECTOR DEFINITIONS
(Cont.)

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Utilities	49	Electric, Gas, and Sanitary
Telecommunications	48	Communications
Wholesale Distribution	50	Durable Goods
	51	Nondurable Goods
Retail Distribution	52	Building Materials, Hardware
	53	General Merchandise
	54	Food
	55	Automotive and Gas Stations
	56	Apparel
	57	Furniture
	58	Eating and Drinking
	59	Miscellaneous Retail
Banking and Finance	60	Banks
	61	Credit Agencies
	62	Security and Commodity Brokers
	67	Holding and Investment Offices
Insurance	63	Insurance (Life, Health, Etc.)
	64	Insurance Agents
Medical	80	Health Services
Education	82	Educational Services

EXHIBIT A-1b

INDUSTRY SECTOR DEFINITIONS
(Cont.)

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Services	72	Personal Services
	73	Business Services (Excluding Information Services Companies Themselves)
	89	Miscellaneous Services
	66	Combinations of Real Estate, Insurance, Loans, Law Offices
	81	Legal Services
	76	Miscellaneous Repair
Federal Government	N/A	As Appropriate
State and Local Government	N/A	As Appropriate
Other Industries	01-09	Agriculture, Forestry, and Fishing
	15-17	Construction
	70	Hotels, Rooming Houses, Camps, and Other Lodging Places
	75	Automotive Repair, Services, and Garages
	78	Motion Pictures
	79	Amusement and Recreation Services, Except Motion Pictures
	83	Social Services
	84	Museums, Art Galleries, Botanical and Zoological Gardens
	86	Membership Organizations

B

Appendix: Market Forecast Data Base, 1989-1994

EXHIBIT B-1

Workstation Software User Expenditure Forecast by Industry Sector, 1989-1994

($ Millions)

Industry Sector	1988	Growth 88-89 (%)	1989	1990	1991	1992	1993	1994	CAGR 89-94 (%)
Total Information Services Industry	6670	39	9290	11475	14225	17560	21875	27045	24
Application Software									
Discrete Manufacturing	280	27	355	450	565	710	895	1130	26
Process Manufacturing	50	35	70	85	110	140	175	225	27
Transportation	70	44	100	125	160	195	245	310	25
Utilities	80	31	105	125	150	175	210	250	19
Telecommunications	30	28	40	50	60	75	95	115	25
Wholesale Distribution	80	32	105	135	175	220	285	365	28
Retail Distribution	70	35	95	115	165	165	295	235	20
Banking & Finance	310	47	455	560	690	850	1045	1285	23
Insurance	210	40	295	360	440	535	650	795	22
Medical	150	38	205	260	330	415	520	655	26
Education	295	18	350	395	450	515	590	670	14
Services	120	40	170	210	265	330	410	515	25
Federal Government	150	35	205	255	315	395	495	620	25
State & Local Gov't	30	36	40	50	60	75	95	115	23
Other Industry Sector	20	50	30	40	50	65	85	110	30
Total Industry Sectors	1945	35	2620	3215	3985	4860	6090	7395	23
Cross-Industry Sector									
Accounting	455	40	635	770	935	1130	1365	1650	21
Education & Training	90	35	120	145	175	210	250	300	20
Engineering & Scientific	130	40	180	230	285	355	445	555	25
Human Resources	90	50	135	170	215	270	340	430	26
Office Systems	930	30	1210	1465	1770	2140	2590	3135	21
Planning and Analysis	870	30	1130	1335	1575	1860	2195	2585	18
Other Cross-Industry Sector	80	40	110	135	165	205	250	305	22
Total Cross-Industry Sectors	2645	33	3520	4250	5120	6170	7435	8960	21
Total Application Software	4590	34	6140	7465	9105	11030	13525	16355	22
Systems Software									
Application Development Tools	1070	50	1605	2020	2550	3210	4045	5095	26
Systems Control	870	38	1200	1515	1905	2400	3025	3815	26
Data Center Management	140	145	345	475	665	920	1280	1780	39
Total Systems Software	2080	51	3150	4010	5120	6530	8350	10690	28

C

Appendix: User Questionnaire

C

Appendix: User Questionnaire

Good morning (afternoon), my name is ________________________. I'm calling from INPUT, an international research and planning firm. We are currently involved in the study of personal computers and PC software, and would like to discuss these subjects with you. Do you have a few minutes now to answer some questions, or may I make an appointment to speak with you at a more convenient time? Your responses will be kept completely confidential and we are seeking no proprietary information.

The purpose of this study is to better advise the PC vendor community on customer needs today and in the future.

"Why are you doing this study?"

As part of our work with the information services industry, we do many internal projects as well as custom projects for clients. The research staff is never told which category the current project falls into until it is completed, so as to not bias your answers.

Hardware

1. What quantity of personal computer brands were used in your organization in 1988? What quantity are planned for use in 1989?

	Quantity in 1988	Quantity YE 1989
Apple	________	________
AST Research	________	________
AT&T	________	________
Burroughs	________	________
Compaq	________	________
Hewlett-Packard	________	________
IBM PC	________	________
IBM PS/2	________	________

Radio Shack (Tandy)	________	________
Sperry	________	________
Other IBM Compatible (specify)		
____________________________	________	________
Other (specify) _______________	________	________

2. Are you planning to change your personal computer brand?

Yes _____ No _____ (If no, go to question 3)

Why?

____

____

____

____

3a. How many of your systems were standalone, linked to mainframes, or linked to others? (Quantity. Interviewer convert percent to quantity.)

	Standalone	Linked to Mainframe	Linked to Others
In 1988	__________	__________	__________
3b. By year-end 1989	__________	__________	__________

4a. What types of operating systems were used in 1988?

4b. What types are planned for purchase in 1989?

	(a) 1988	(b) YE 1989	(c) Preference	(d) Why?
DOS	____	______	________	________
OS/2	____	______	________	________
UNIX	____	______	________	________
Macintosh	____	______	________	________
Pick	____	______	________	________
Other (specify)				
__________	____	______	________	________

4c. What is your preference?

4d. Why?

____

____

____

5a. What *types* of PC software did you have installed in 1988? (Not specific packages.)

5b. What new software do you plan to acquire in 1989?

	1988	YE 1989
Systems Software		
LAN	______	______
Micro Mainframe Links	______	______
Security Systems	______	______
Windowing Systems	______	______
Data Base Management Systems	______	______
Computer-Aided Software Engineering	______	______
4th Generation Languages	______	______
Utilities	______	______
Other (specify) ______________	______	______

Applications Software

Accounting	________	________
Human Resources (Benefits/ Payroll/Personnel)	________	________
Education & Training (Computer Assisted Instruction)	________	________
Project Management	________	________
Financial Planning	________	________
Planning & Analysis	________	________
(Financial Planning, Modeling, Spreadsheet Systems, Project Management)	________	________
Engineering/Scientific (CAD/CAM/CAE, Statistics, etc.)	________	________
Business Graphics	________	________
Word Processing	________	________
Desktop Publishing	________	________
Banking & Finance	________	________
Discrete Manufacturing	________	________
Distribution (Retail & Wholesale)	________	________
Education	________	________
Federal Government	________	________
Insurance	________	________
Medical	________	________
Process Manufacturing	________	________
Services	________	________
State & Local Government	________	________
Telecommunications	________	________
Transportation	________	________
Utilities	________	________
Other	________	________

6a. What are the names of the two top vendors in each category that were the suppliers of your 1988 software? Please estimate the number of packages of each. (Interviewer must account for all types of packages in 5a and 5b.)

Systems Software	Vendor/ Pkg.	Approx. No.	Vendor/ Pkg.	Approx. No.
LAN	________	________	________	________
Micro Mainframe Links	________	________	________	________
Security Systems	________	________	________	________
Windowing Systems	________	________	________	________
DBMS	________	________	________	________
CASE	________	________	________	________

4GL ________ ________ ________ ________
Utilities ________ ________ ________ ________
Other (specify)
____________________ ________ ________ ________ ________

Applications Software

Accounting ________ ________ ________ ________
Human Resources (Benefits/Payroll/ Personnel) ________ ________ ________ ________
Education & Training (CAI) ________ ________ ________ ________
Project Management ________ ________ ________ ________
Financial Planning ________ ________ ________ ________
Planning & Analysis (Fin'l Plng, Modeling Spreadsheet Sys., Project Management) ________ ________ ________ ________
Engineering/Scientific ________ ________ ________ ________
(CAD/CAM/CAE, Statistics, etc.) ________ ________ ________ ________
Business Graphics ________ ________ ________ ________
Word Processing ________ ________ ________ ________
Desktop Publishing ________ ________ ________ ________
Banking & Finance ________ ________ ________ ________
Discrete Manufacturing ________ ________ ________ ________
Distribution (Retail & Wholesale) ________ ________ ________ ________
Education ________ ________ ________ ________
Federal Government ________ ________ ________ ________
Insurance ________ ________ ________ ________
Medical ________ ________ ________ ________
Process Manufacturing ________ ________ ________ ________
Services ________ ________ ________ ________
State & Local Government ________ ________ ________ ________
Telecommunications ________ ________ ________ ________
Transportation ________ ________ ________ ________
Utilities ________ ________ ________ ________
Other ________ ________ ________ ________

6b. What are the names of the two top vendors in each category that will be the suppliers of your 1989 software? Please estimate the number of packages of each. (Interviewers must account for all packages in 5a and 5b.)

	Vendor/ Pkg.	Approx. No.	Vendor/ Pkg.	Approx. No.
Systems Software				
LAN				
Micro Mainframe Links				
Security Systems				
Windowing Systems				
DBMS				
CASE				
4GL				
Utilities				
Other (specify)				
____________________				
Applications Software				
Accounting				
Human Resources (Benefits/Payroll/ Personnel)				
Education & Training (CAI)				
Project Management				
Financial Planning				
Planning & Analysis (Fin'l Plng, Modeling, Spreadsheet Sys., Project Management)				
Engineering/Scientific				
(CAD/CAM/CAE, Statistics, etc.)				
Business Graphics				
Word Processing				
Desktop Publishing				
Banking & Finance				
Discrete Manufacturing				
Distribution (Retail & Wholesale)				
Education				
Federal Government				
Insurance				
Medical				
Process Manufacturing				

Services	______	______	______	______
State & Local Government	______	______	______	______
Telecommunications	______	______	______	______
Transportation	______	______	______	______
Utilities	______	______	______	______
Other	______	______	______	______

7. What is the average number of application programs used per PC?

____

8. Please indicate your company's approximate expenditures for outside developed software (in thousands of dollars) in 1988. In 1989.

	1988	YE 1989
Systems Software	$______	$______
Application Software	$______	$______

9. Please rate each of the following factors in their importance to your company in choosing microcomputer software, on a scale of 1-5 where 1 = least important and 5 = most important.

	Level of Importance				
Price	1	2	3	4	5
Vendor reputation	1	2	3	4	5
Customer support by vendor	1	2	3	4	5
Customer support by dealer/distributor	1	2	3	4	5
Software performance	1	2	3	4	5
Software features	1	2	3	4	5
Ease of use	1	2	3	4	5
Ease of training	1	2	3	4	5
Micro-mainframe links	1	2	3	4	5

Interfaces to other software	1	2	3	4	5
Documentation	1	2	3	4	5
Security features	1	2	3	4	5
IBM compatibility	1	2	3	4	5
Source code availability	1	2	3	4	5
Vendor's financial stability	1	2	3	4	5
Lack of copy protection	1	2	3	4	5
Site licensing	1	2	3	4	5

10. What types of problems are you experiencing with your existing software? Please rate the extent of the problem for each category, on a scale of 1 - 4, where 1 = not a problem and 4 = a severe problem.

(Interviewer: 1 = not a problem, 2 = minor problem, 3 = serious problem, 4 = severe problem, 5 = not applicable.)

Usefulness for intended purpose	1	2	3	4	5
Documentation clarity	1	2	3	4	5
Documentation organization	1	2	3	4	5
Installation (ability to get software up and running)	1	2	3	4	5
Vendor/technical support	1	2	3	4	5
Ease of use	1	2	3	4	5
Performance	1	2	3	4	5
Compatibility with other software packages	1	2	3	4	5
Micro-mainframe links	1	2	3	4	5

Training and Support

11a. What types of support are offered by your vendors? Are you charged a fee or are they free?

	(a) Not Offered	(a) Fee	(a) Free	(b) Rating				
Centralized support	_______	_____	_____	1	2	3	4	5
Free training	_______	_____	_____	1	2	3	4	5
Purchased training	_______	_____	_____	1	2	3	4	5
Customization	_______	_____	_____	1	2	3	4	5
Software fixes	_______	_____	_____	1	2	3	4	5
Consulting	_______	_____	_____	1	2	3	4	5
Upgrades	_______	_____	_____	1	2	3	4	5
Other (describe) _______________	_______	_____	_____	1	2	3	4	5

11b. How would you rate their value on a scale of 1-5, where 1 = least value and 5 = greatest value?

12. What types of support are supplied internally from your company?

____

____

____

13. What types of problems are you experiencing with your existing vendor support?

____

____

____

14. What types of improvements in training and support from vendors would you like to see?

____

____

____

15a. Do you see the need for training and support provided by vendors increasing or decreasing?

Increasing _____ Decreasing _____ Remains the same _____

15b. Why?

____

____

____

16a. Would you pay for vendor training and/or support?

Yes _____ No _____

16b. Why or why not?

____

____

____

New Product Needs

17. What features are missing in today's end-user software packages that will be a requirement in the future?

____

____

____

18. Where do you learn about new applications?

____

____

____

19. What improvements in microcomputer software would you like to see?

____

____

____

20. What types of products would you like to have that are not currently available? List the top three.

1. ______________________________________
2. ______________________________________
3. ______________________________________

Distribution Channels Used

21. What percentage of your company's software purchases are made through the following channels:

Department	Now	Future	Preference
MIS Dept. or Inf. Center	_____%	_____%	__________
Retail	_____%	_____%	__________
Mail Order	_____%	_____%	__________
Direct	_____%	_____%	__________
VAR	_____%	_____%	__________
OEM	_____%	_____%	__________
Other _____________	_____%	_____%	__________
TOTAL	100%	100%	

Decision-Making Criteria

22. How much influence do the following groups have in the purchase decision? Use a scale of 1 - 5, where 1 = least influence and 5 = most influence.

MIS/DP	1	2	3	4	5
User departments	1	2	3	4	5
Top Corporate management	1	2	3	4	5
Administration	1	2	3	4	5
Finance department	1	2	3	4	5
Other (specify)__________	1	2	3	4	5

23. How much involvement does the MIS/DP department have in the following aspects of purchasing personal computer software in your organization? Use a scale of 1 - 5, where 1 = least involved and 5 = high degree of involvement.

Advises user department on purchases	1	2	3	4	5
Plans use and applications with user departments	1	2	3	4	5
Buys PC software for user department as needed	1	2	3	4	5
Sets standards for purchases by user department	1	2	3	4	5
Test and evaluation	1	2	3	4	5
Establishes an approved vendor list	1	2	3	4	5
Other (specify) ______________________________	1	2	3	4	5

D

Appendix: Vendor Questionnaire

D

Appendix: Vendor Questionnaire

Good morning (afternoon), my name is ______________________. I'm calling from INPUT, an international research and planning firm. We are currently involved in the study of software for personal computers and would like to discuss this subject with you. Do you have about a half hour now, or may I make an appointment to speak with you at a more convenient time? Your responses will be kept completely confidential and we are seeking no proprietary information.

Software

1a. For what operating systems do you develop software ?

1b. Are there any changes planned for within the next two years to add or delete operating systems?

	(a) 1988 (check all that apply)	(b) Future Circle one (Add/Delete/Continue)
DOS	____	Add/Delete/Continue
OS/2	____	Add/Delete/Continue
UNIX	____	Add/Delete/Continue
Macintosh	____	Add/Delete/Continue
Pick	____	Add/Delete/Continue
Other (specify) _____________	____	Add/Delete/Continue

2. What basic technologies do you work with? (for example semi conductor (RAM,RISC), micro processor, disk storage, H/W arch., S/W arch.,S/W tools)

____

____

____

3a. What *types* of PC software did you develop and release before 1989? (Not specific packages.)

3b. What portion of your revenue would you attribute to this software by category?

3c. What new types of software do you have under development and plan to release within the next two years?

	Current (a)	Revenue (b)	Future (c)
Systems Software			
LAN	______	______	______
Micro-mainframe links	______	______	______
Security Systems	______	______	______
Windowing Systems	______	______	______
Data Base Management Systems	______	______	______
Computer-Aided Software Engineering	______	______	______
4th Generation Languages	______	______	______
Utilities	______	______	______
Other (specify) ________________	______	______	______
General Applications Software			
Accounting	______	______	______
Human Resources (Benefits/ Payroll/Personnel)	______	______	______
Education & Training (Computer-Assisted Instruction)	______	______	______
Project Management	______	______	______
Financial Planning	______	______	______
Planning & Analysis (Financial Planning, Modeling, Spreadsheet Systems, Project Management)	______	______	______
Engineering/Scientific (CAD/CAM/CAE, Statistics, etc.)	______	______	______
Business Graphics	______	______	______

Word Processing	______	______	______
Desktop Publishing	______	______	______
Industry-Specific Application Software			
Banking & Finance	______	______	______
Discrete Manufacturing	______	______	______
Distribution (Retail & Wholesale)	______	______	______
Education	______	______	______
Federal Government	______	______	______
Insurance	______	______	______
Medical	______	______	______
Process Manufacturing	______	______	______
Services	______	______	______
State & Local Government	______	______	______
Telecommunications	______	______	______
Transportation	______	______	______
Utilities	______	______	______
Other	______	______	______

4. Are there any new products that you have released within the last year?

____

____

____

5. Are there any other recent activities of your company of note? (Such as new releases, training seminars, ties with new equipment, alliances, etc.)

____

____

____

6. Does your company have a specific approach to product integration or are all products standalone only?

____

____

____

7a. What percentage of your software is developed for systems that are standalone, linked to mainframes, or linked to others?

	Standalone	Linked to Mainframe	Linked to Others
In 1988	______	______	______
7b. Future Plans	______	______	______

8. Please indicate your company's approximate revenue from personal computer software (in $ millions) in 1988. What do you expect revenue to be for fiscal year 1989? 1990?

	1988	YE 1989	YE 1990
Systems Software	$______	$______	$______
Application Software	$______	$______	$______

9. How many employees does your company have? Could you break them down into the following areas?

Executive Mgmt. ______
Sales/Marketing ______
Research/Development ______
Administrative ______

Total ______

Pricing

10. At what volume levels do you offer discounts?

Volume	Percent Discount
______	______
______	______
______	______
______	______

11a. Do you currently offer site licensing arrangements?

Yes ________ No _______

11b. Are you planning to in the future?

Yes ________ No _______

Why?

____

____

____

Training and Support

12a. What types of support do you offer your customers? Are these services offered for a fee or free?

12b. How do you believe your clients rate the following elements of support on a scale of 1-5, where 1 = least value and 5 = greatest value?

	(a)			(b)				
	Not Offered	Fee	Free	Rating				
Centralized support	_______	_____	_____	1	2	3	4	5
Free training	_______	_____	_____	1	2	3	4	5
Purchased training	_______	_____	_____	1	2	3	4	5
Customization	_______	_____	_____	1	2	3	4	5
Software fixes	_______	_____	_____	1	2	3	4	5
Consulting	_______	_____	_____	1	2	3	4	5
Upgrades	_______	_____	_____	1	2	3	4	5
Other (describe) ______________	_______	_____	_____	1	2	3	4	5

13. Are there any other types of customer support that are supplied by your company?

14. What types of improvements in training and support are you planning to provide for your customers in the future?

15a. Do you see the need increasing or decreasing for training and support that you supply to your customers?

Increasing _____ Decreasing _____ Remaining the same _____

15b. Why?

16. Where do you see the software industry going in the next five years? Any major trends that will affect the way that you do business or your customer base?

17a. What does your company think about the thrust for standardization of operating systems and network protocols in the PC marketplace?

17b. What is your company's involvement in this standardization?

18. What do you think are the company's competitive strengths?

19. What are some of the company's strategies to retain or increase market share?

20. What do you think is your market share in the following areas?

Systems Software

LAN ________
Micro-mainframe links ________
Security Systems ________
Windowing Systems ________
Data Base Management Systems ________
Computer-Aided Software Engineering ________
4th Generation Languages ________

Utilities ________
Other (specify) ________________ ________

General Applications Software

Accounting ________
Human Resources (Benefits/
Payroll/Personnel) ________
Education & Training
(Computer Assisted Instruction) ________
Project Management ________
Financial Planning ________
Planning & Analysis ________
(Financial Planning, Modeling,
Spreadsheet Systems, Project
Management)
Engineering/Scientific
(CAD/CAM/CAE, Statistics, etc.) ________
Business Graphics ________
Word Processing ________
Desktop Publishing ________

Industry-Specific Application Software

Banking & Finance ________
Discrete Manufacturing ________
Distribution (Retail & Wholesale) ________
Education ________
Federal Government ________
Insurance ________
Medical ________
Process Manufacturing ________
Services ________
State & Local Government ________
Telecommunications ________
Transportation ________
Utilities ________
Other ________

21. Are there any particular industry markets where you are concentrating your efforts? Could you rank them?

Discrete Mfg. ______
Process Mfg. ______
Transportation ______
Utilities ______
Insurance ______
Medical ______
Education ______
Services ______

Telecomm. ______
Wholesale ______
Retail ______
Banking/Finance ______
Fed Gov't. ______
State/Local Gov't. ______
Other ______
Cross-Industry______

22. How do you fund research and development on new products?

Internal sources ______
Teaming arrangements ______
Other sources ______

Distribution Channels

23a. What percentage of your company's software revenue is obtained through the following channels:

23b. What are your preferred channels of distribution?

		(a)	(b)
Channel	Now	Future	Preference
Retail	_____%	_____%	__________
Retail	_____%	_____%	__________
Jobber	_____%	_____%	__________
Mail Order	_____%	_____%	__________
Direct	_____%	_____%	__________
(would you be able to break Direct in the delivery modes?)			
VAR	_____%	_____%	__________
OEM	_____%	_____%	__________
Turnkey	_____%	_____%	__________
Combination processing			
Services/software	_____%	_____%	__________
Facilities management	_____%	_____%	__________
Systems integration	_____%	_____%	__________
Users	_____%	_____%	__________
Other	_____%	_____%	__________
Other ______________	_____%	_____%	__________
TOTAL	100%	100%	

24a. Which of the following elements of your customer's organization do you consider to be your target audience?

24b. What is their level of influence on the purchasing decision?
(Use a scale of 1 - 5, where 1 = least influence and 5 = most influence.)

	Audience	Influence				
MIS/DP	____	1	2	3	4	5
User departments	____	1	2	3	4	5
Top corporate management	____	1	2	3	4	5
Administration	____	1	2	3	4	5
Finance department	____	1	2	3	4	5
Other (specify)__________	____	1	2	3	4	5

Partnerships and Joint Ventures

25a. Is your company currently involved in any joint marketing arrangements? With whom? Could you explain some of the details?

____

____

____

25b. How successful have these arrangements been? Why?

____

____

____

25c. Are you in the process of forming any other relationships at this time?

____

____

____

26. Do you see any major changes in the PC marketplace over the next ten years in the following areas?

types of technology employed? ______________________________

____

delivery modes? ______________________________

____

structure of the industry? ______________________________

____

other areas? ______________________________

____

27. Do you believe that all of your research needs are being met for information to help you in your strategic planning?

Yes ______ No ______

Where would you like to see more of a concentration of research on this marketplace?

____

____

____

Report Quality Evaluation

To our clients:
To ensure that the highest standards of report quality are maintained, INPUT would appreciate your assessment of this report. Please take a moment to provide your evaluation of the usefulness and quality of this study. When complete, simply fold, staple, and drop in the mail. Postage has been pre-paid by INPUT if mailed in the U.S..

Thank You.

1. Report title: ***Personal Computer Software Markets*** (MPCS)

2. Please indicate your reason for reading this report:
   - ☐ Required reading
   - ☐ Area of high interest
   - ☐ Area of general interest
   - ☐ New product development
   - ☐ Business/market planning
   - ☐ Product planning
   - ☐ Future purchase decision
   - ☐ Systems planning
   - ☐ Other ____________________

3. Please indicate extent report used and overall usefulness:

	Extent		Usefulness (1=Low, 5=High)				
	Read	Skimmed	1	2	3	4	5
Executive Overview	☐	☐	☐	☐	☐	☐	☐
Complete Report	☐	☐	☐	☐	☐	☐	☐
Part of Report (_____ %)	☐	☐	☐	☐	☐	☐	☐

4. How Useful was:

Data presented	☐	☐	☐	☐	☐
Analyses	☐	☐	☐	☐	☐
Recommendations	☐	☐	☐	☐	☐

5. How useful was the report in these areas:

Alert you to new opportunities or approaches	☐	☐	☐	☐	☐
Cover new areas not covered elsewhere	☐	☐	☐	☐	☐
Confirm existing ideas	☐	☐	☐	☐	☐
Meet Expectations	☐	☐	☐	☐	☐
Other ______________________________	☐	☐	☐	☐	☐

6. Which topics in the report were the most useful? Why? ____________________________________

   ____

7. In what ways could the report have been improved? ____________________________________

   ____

8. Other comments or suggestions: ____________________________________

   ____

Name ______________________ Title ______________________

Department ______________________

Company ______________________

Address ______________________

City ______________________ State __________ ZIP __________

Telephone ______________________ Date Completed ______________________

Thank you for your time and cooperation.

M&S 633/01 12/89

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